THE MODEL ENGINEER

EXHIBITION NUMBER

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L.B.S.C.'s LOBBY CHAT ● A SIMPLE GEARED IMPULSE TURBINE

AUGUST 19th 1954

Vol. III No. 2778

9D

NEWS FLASH

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by BURNERD

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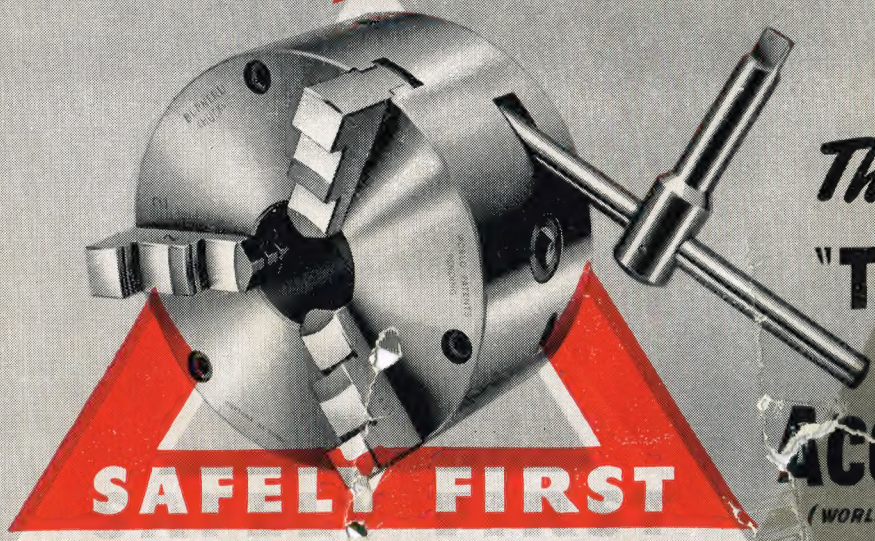

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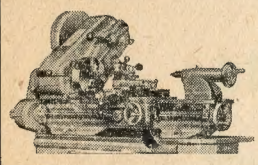

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	9402	MYFORD "Super 7" 3½" x 19" High Speed Centre Lathe complete with Standard Equipment (LESS MOTOR)	73	5	0
	5824	Steel CABINET STAND with Screwcutting Panel, Reversing Switch and Wiring, (LESS MOTOR)	16	7	6
	1221	Electric Motor, 1/3 h.p. for "ML7" (State Mains Voltage.....)	7	16	3
	1224	Electric Motor, ½ h.p. for "S7" (State Mains Voltage.....) ...	8	11	7
	5822	Reversing Switch for Bench Lathe ...	1	7	0
	5871	Reversing Switch Bracket		9	0
	6050	JACOB Drill Chuck, 0-½" x 2 M.T. ...	1	15	7
	6481	JACOB Drill Chuck, 0-⅜" x 2 M.T. ...	2	1	4
	6062	JACOB Drill Chuck, 0-½" x 2 M.T. ...	2	9	10
	5938	BURNERD 6" x 4-jaw Ind. Screwed Body Lathe Chuck	6	5	0
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	5804	Angle Plate, 3" x 2" x 1½"		5	3
	5805	Angle Plate, 4" x 2½" x 1½"		10	0
	7300	Angle Plate, 4½" x 3½" x 3"		18	0
	5806	Angle Plate, 6" x 2½" x 2½"		15	0
	5807	Vee Block, 3" x 1½" x 1½"		5	3
	5808	Vee Block, 4" x 2" x 1½"		6	6
	5809	Set (4) Faceplate Dogs, 2½"		5	0
	5813	Set (3) Lathe Carriers, ½", ¾", 1" ...		11	6
	5814	Machine Vice		18	6
	5815	Boring Bar, 13" with 3 Cutters ...	1	7	6
	5816	Set (8) H.S. Slide Rest Tools, 5/16" sq. ...	1	12	0
	5817	Set (12) H.S. Slide Rest Tools, ⅜" sq.	3	0	0
	5818	Arbor for Milling Cutters (Cutters quoted on request)	1	15	0
	5819	Set (6) Handle Tools for Metal ...	1	3	3
	9789	Set (6) Handle Tools for Wood ...	1	8	3
	5823	Gallon Tin SHELL Vitrea Oil ...		9	9
	10317	Set (4) Tee Bolts—Machine Vice to V Slide, etc.		4	0
	10316	Live Lathe Centre, 2 M.T.	1	17	6
	5825	Circular Saw Table with 5" Saw for Metal	5	7	6
	5826	Extra Saw for Metal, 5"	1	18	3
	5827	Extra Saw for Wood, 6"		12	6
	5828	Turret Attachment (equipment for boring *in situ* loaned on request)	11	15	0
	9070	Multiple Stop ... ... (Excellent range of Tooling for Turret quoted on request).	4	0	9
	5829	Connecting Rod Bearing Fixture with Boring Bar	6	10	0
	9407	"ML7" Countershaft Clutch Unit with Swing Head, ready for fitting ...	6	10	0
	5830	Four Tool Turret	3	7	6
	5831	Lever Operated Collet Attachment with ⅝" Collet	9	17	6

Quantity	Code	Description	£	s.	d.
	5832/1431	Extra Collets, ¼", ½", ⅝" and ½" each ...	1	10	6
	5836	Fixed Steady	2	15	0
	5837	Travelling Steady	1	15	0
	5838	Thread Dial Indicator		14	6
	5839	Hand Rest and Base for Wood Turning	1	6	6
	5840	Extra Rest for Metal		10	0
	1430	Extra Rest for Wood		10	0
	5841	Taper Turning Attachment ...	10	15	0
	5842	Leadscrew Handwheel with Pointer	1	4	0
	5843	Tailstock Adaptor, 2 M.T.		17	6
	9254	Rear Toolpost	1	15	6
	5844	T/S Dieholder, 13/16" x 2 M.T. ...		15	0
	5845	T/S Dieholder, 1" x 2 M.T.		17	6
	5846	Faceplate, 9" dia.	1	12	0
	1432/3	Patent Collets, 2 M.T., 1/16" & 3/32" ea.	1	10	3
	5847/53	Patent Collets, 2 M.T., ⅛", 3/16", ¼", 5/16", ⅜", 7/16", & ½" each	1	5	3
	5854	Collet Nosepiece		15	0
	5855	Collet Closing Tube		10	0
	5856	"ML7" Lever Operated Tailstock Attachment	2	7	6
	10070	COWELL Tailstock Rack Feed Attachment (ML7)	5	5	0
	10224	COWELL Tailstock Rack Feed Attachment (S7)	6	0	0
	5857	Dividing Attachment with 2 Division Plates	14	0	0
	1434	No. 3 & 4 Division Plates for above, pair	4	12	6
	9255	Extra Long Cross Slide	2	17	9
	5862/3	Set (2) Drill Pads, plain & vee with Hollow Centre		16	9
	5864	Set (4) Bolts & Nuts for Boring Table, 3"		8	9
	5865	Set (4) Bolts & Nuts for Boring Table, 6"		11	3
	5869	Steel Suds Tray with Drain Plug ...	2	5	0
	5870	Cut Off Slide, screw operated ...	10	5	0
	9410	"ML7" Lathe Cover	1	6	3
	1435	"S7" Lathe Cover	2	12	6
	5889	Set (12) H.S. Quick Setting Lathe Tools with Boat	3	9	4

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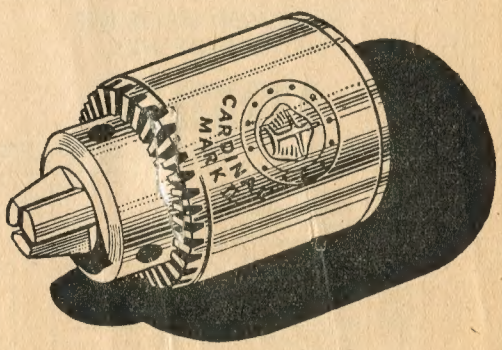

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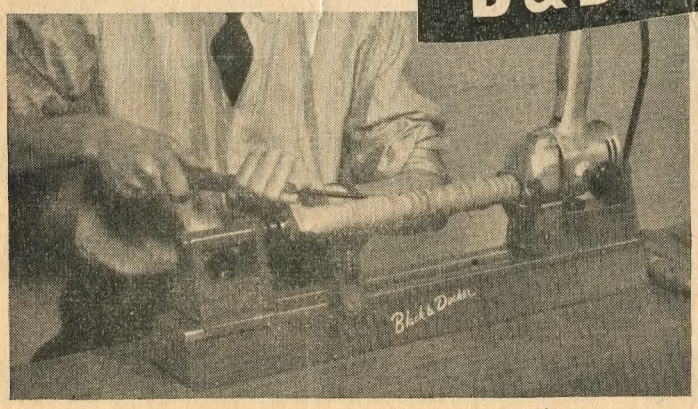

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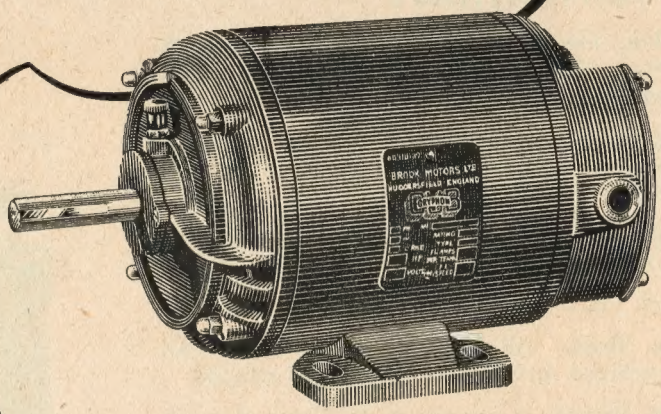

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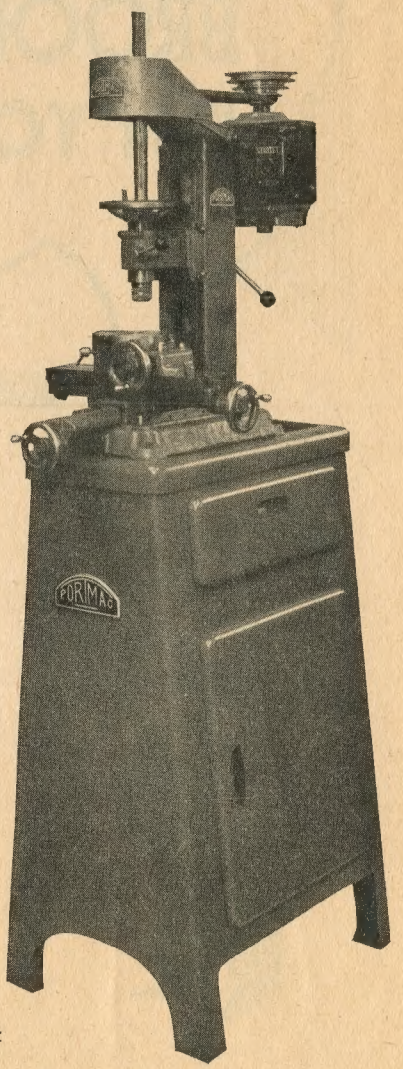

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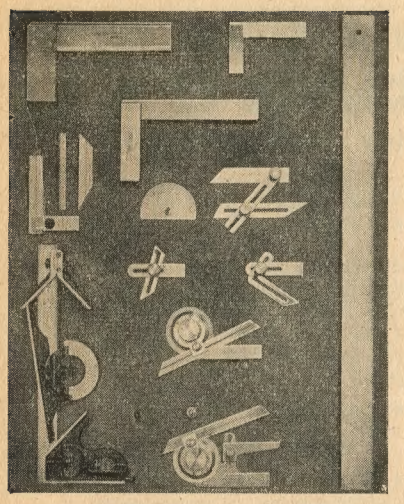

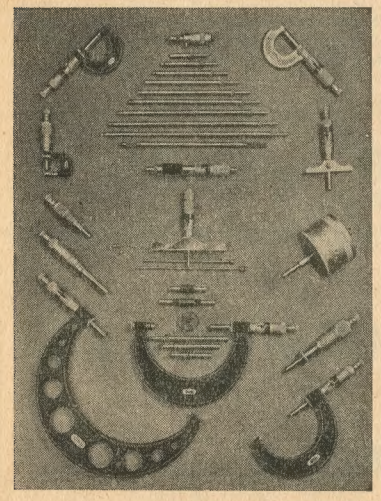

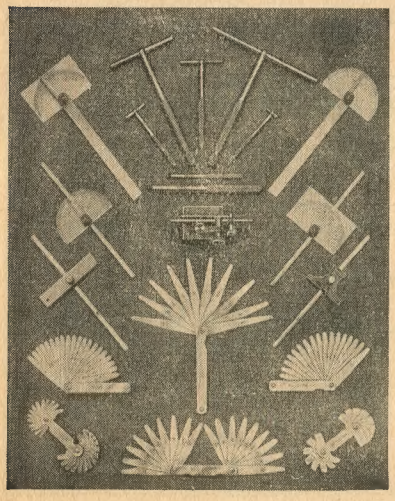

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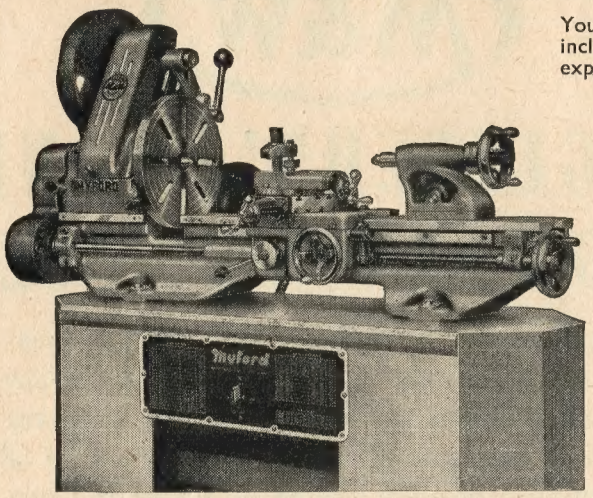

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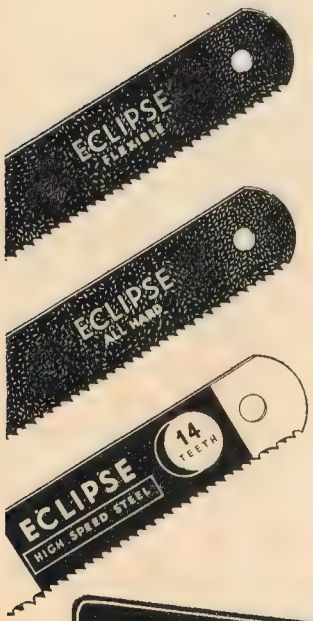

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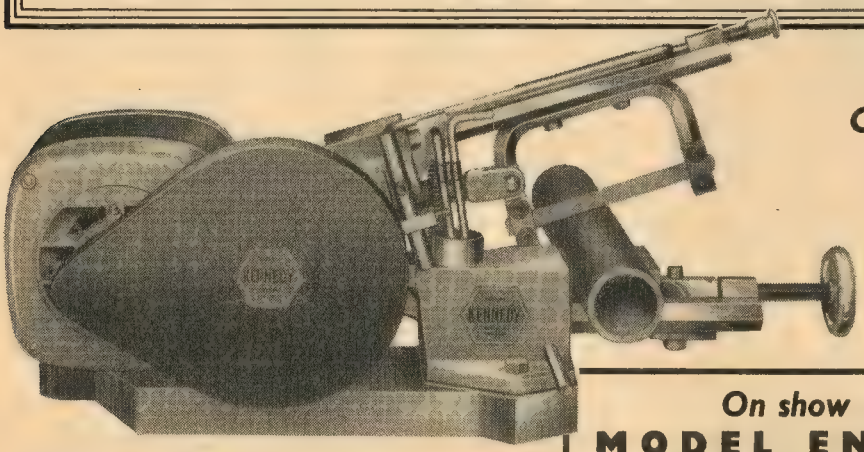

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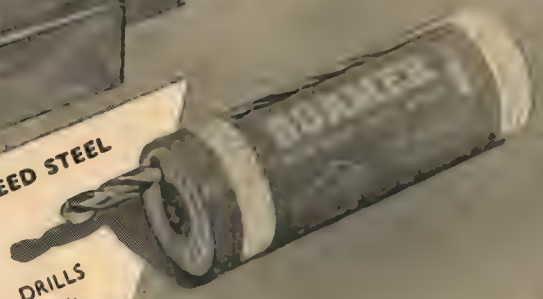

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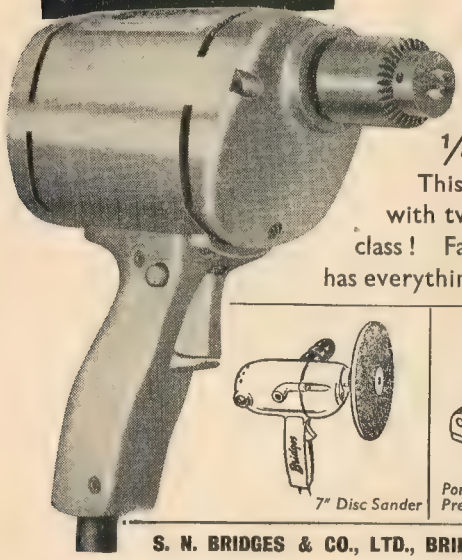

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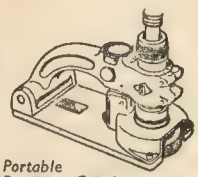
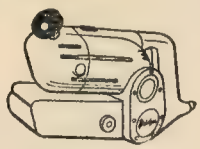


Portable Precision Grinder



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1 lb.	8017	Mixed Phillips Recess Screws	11d.
1 gross	142	5/16" Whit. x 1" C.H. Screws, steel	1/1
1 gross	168	2 B.A. x 3/8" Csk. Screw, C.P. steel	6d.
1 gross	193	2 B.A. x 5/8" Grub Screw, C.P. steel ...	7d.
1 gross	209	4 B.A. x 3/16" R.H. Screw, steel	5d.
1 gross	239	4 B.A. x ½" Csk. Screw, steel	5d.
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1 gross	261	5 B.A. x 5/8" R.H. Screw, brass	6d.
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1 gross	321	6 B.A. x 3/8" Csk. Screw, brass	3d.
1 gross	356	8 B.A. x ½" C.H. Screw, brass	3d.
1 gross	362	8 B.A. x 7/32" Csk. Screw, steel	3d.
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Length 8¾ in. Weight 5½ oz.

Rubber Hose required, 5/16 in. or ⅜ in. bore.

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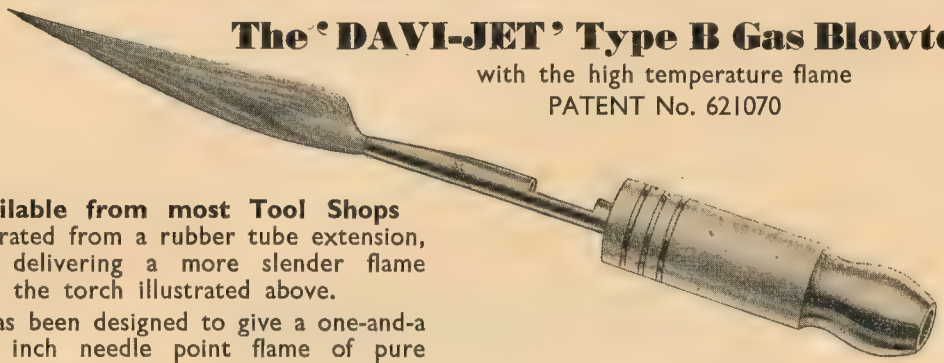
PATENT No. 621070



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It has been designed to give a one-and-a half inch needle point flame of pure concentrated heat.

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THE
MODEL ENGINEER

EVERY THURSDAY

Volume 111 - No. 2778

AUGUST 19th - 1954

ESTABLISHED 1898

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Our Cover Picture

Model engineering, and indeed, every branch of mechanical work, is dependent basically on that most important of all machine tools, the lathe. Long ago, it was said that he who is master of the lathe, is master of the whole craft of engineering, and that is just as true at the present day. The lathes employed by model engineers are generally simple, and in some respects primitive, compared with those used in modern manufacturing industries, but they have remarkable versatility, being adaptable for many operations besides turning; and their capabilities for producing fine, accurate work are shown in the many excellent models to be seen at the "M.E." Exhibition.

SMOKE RINGS

Our Trade Exhibitors

IN THIS issue will be found a comprehensive review of the trade displays at the "M.E." Exhibition, compiled from the information available at the time of going to press. We are pleased to observe that the variety and scope of these exhibits is as great as ever, and that there is evidence of considerable progress in the design and quality of tools and equipment specially suited to the requirements of model engineers. The trade section is an integral part of the annual "M.E." Exhibition, which is highly appreciated by the great majority of our visitors, affording as it does a comprehensive view of the model trade and an opportunity to discuss freely their wants and problems with traders. There is no more suitable occasion than this, where the entire market is gathered together at one time and place, for the establishment of friendly relations between trader and customer, and where a mutual keenness to advise, explain and demonstrate is in evidence, with no obligation or pressure to purchase. Most of the negotiations at the "M.E." Exhibition are in the nature of reconnaissance rather than definite business; the direct sales or booking of orders are a small matter compared with those which materialise later after the prospective customer has examined, discussed and compared the goods offered, and subsequently made his decision after careful consideration at his leisure. Many visitors at past Exhibitions, both from this country and abroad, have expressed their appreciation of the courtesy and kindness encountered at the trade stands.

An Exhibition Rendezvous

ONE OF the features of the Exhibition which many readers appreciate is the opportunity of personal contacts which it affords, and many new friendships are made, or old ones renewed, at club stands or other pre-arranged meeting places. This year, however, the difficulties which are sometimes encountered in contacting the right person at the right time will, we hope, be considerably eased by the facilities which are offered at THE MODEL ENGINEER stand, where some member of the permanent staff will always be available to take messages or book appointments. It will readily be understood that our technical editors, who are never at any time over-burdened with leisure, will be busier than ever during the period of the Exhibition, and frequently called upon to be in two or three places at once. Consequently they cannot guarantee to be always available at the stand or even within the precincts of the hall, but they are always pleased to meet readers who have definite matters to discuss, in so far as their duties will allow. Overseas visitors are especially invited to make themselves known at THE MODEL ENGINEER stand, and to give us details of their activities, or to tell us of difficulties or handicaps, on which we may be able to offer some helpful advice.

Malden Gala, As Usual

The Malden & District Society of Model Engineers will be holding its usual "Locomotive Gala" on Sunday, August 22nd. during the period of THE MODEL ENGINEER Exhibition.

A cordial invitation is extended to all who can take along locomotives and to others who may be in town for the Exhibition. The society's track is at Claygate Lane, Thames Ditton, which is half way between Kingston and Esher and alongside the Southern main line.

Refreshments will be available at moderate prices, free car park and shelter should the weather be showery.

Hon. Secretary: G. C. SMITH, 101, Tudor Drive, Kingston-on-Thames.

What to see at . . .

THE MODEL ENGINEER EXHIBITION

MORE COMPETITION MODELS

MR. R. J. FROSTICK, of Ealing, has entered a steam yacht engine with twin cylinders ¾-in. bore, with feed pump and mechanical lubricator. This is a free-lance design, and one of the special features is the provision of a variable stroke in the feed pump for regulating the output.

An example of the handsome Easton & Amos Grasshopper Beam engine is entered by Mr. K. W. Harris of Northampton. This is based on the design published in THE MODEL ENGINEER in 1939, and in addition, it is housed in a part-sectional pump house.

The castings used for construction were made from the competitor's own patterns.

Mr. H. E. Rendall, who is well known to readers for his letters and articles on historical engines, has produced a 1-in. × 2-in. horizontal agricultural engine on a brickwork plinth, representing the type of engine as made for farmers by Messrs. E. R. and F. Turner about 100 years ago. The information on the design has been obtained from a woodcut in Bourne's *Catechism of the Steam Engine*, 1863.

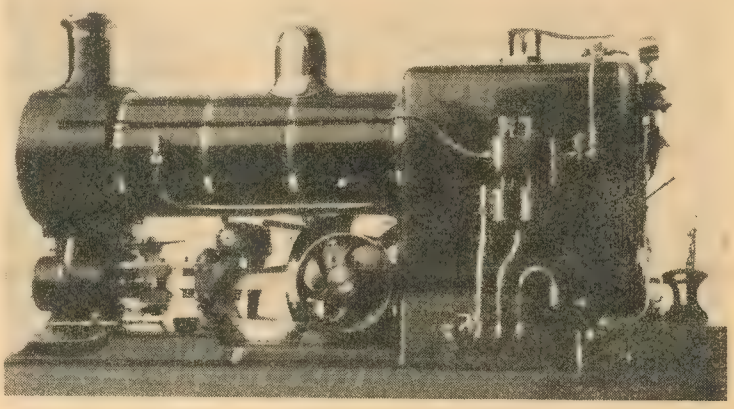
A type of model which deserves to be much more popular than it is at the present time is exemplified in the model hand power Jib Crane by Mr. G. L. Bath of Caterham. This is built entirely from memory, as no drawings or other illustrations were available.

Continued from page 185, *August* 12, 1954.

An item of steam plant which has never before been represented at the Exhibition is the electrode boiler by Mr. L. E. Tovey of Harrow Weald. This is a 3-kilowatt boiler working on 240 volts single-phase, and producing a pressure of 60 lb. per sq. in., based on full-size 3-phase boilers as made by Messrs. Bastian & Allen Ltd., which are becoming increasingly popular for industrial purposes where a readily available and automatic steam supply is required. In this type of boiler, the water carried in the boiler is used as a resistance element, and this gives very high thermal efficiency and is also automatic, and in the event of the boiler becoming dry, the current is automatically cut off.

Another type of model which has never before been seen at the Exhibition is the ¼-in. scale Whale Gun, by Mr. W. C. Gay, of Hayes, Middlesex, made from photographs and drawings in the Norsk Sjofarts Museum, Oslo, and data supplied by the makers. It is a full working model, with breech mechanism, recoil spring and other working details, and has a firing range of 10 ft.

A naval gun of the 1800 period is entered by Mr. J. G. Williams of London, N.1.



A free-lance undertype steam engine by Mr. J. E. Kelly

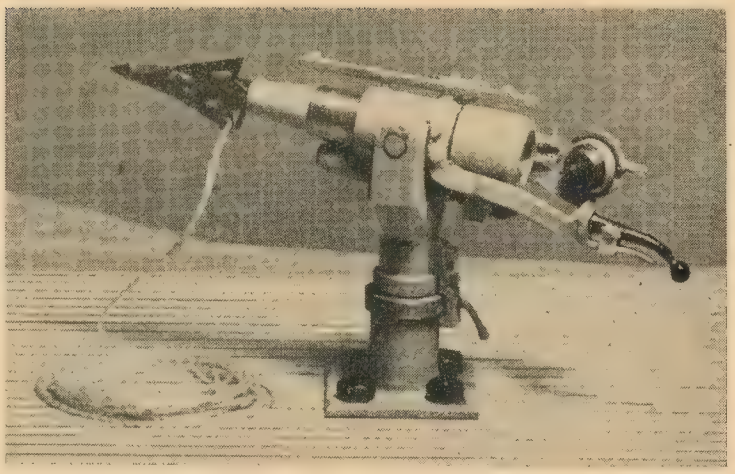
Internal Combustion Engines

Most of the models in the Internal Combustion Engine class are from designs which have been published in THE MODEL ENGINEER, and its companion journals. They include an example of the twin 30 c.c. o.h.v. petrol engine as designed for the petrol-driven locomotive "1831," the description of which was published in 1942, by Mr. G. L. Jones, of Hackney, E.9. The constructor is a member of the Victoria Model Steam Boat Club, and has built the engine for use in a model boat, for which purpose it is quite well suited.

The very popular "Seal" 4-cylinder engine again makes an appearance, this time being constructed by Mr. G. Fletcher of Barnoldswick. This is stated to be an 18 c.c. engine, which is rather interesting in view of the fact that the original design is for a 15 c.c. engine, but allowance was made for opening the bores out to increase capacity.

An example of the Ensign 10 c.c. 2-stroke engine which was originally designed for model cars and described in *Model Car News*, is entered by Mr. L. G. Seale, of Kilburn, N.W.6, and has been adapted for water cooling and fitted with a gear-wheel circulating pump and silencers. Again the intention is to use the engine to drive a high-speed launch now under construction, and which is intended to be radio controlled.

Mr. D. Widmer, of Forest Hill, S.E.23 has entered a "Busy Bee" 50 c.c. auxiliary engine built from the description in THE MODEL ENGINEER; this engine has already been in regular use propelling a bicycle, having completed 700 miles, and has been found capable of a maximum speed on the level of 25 m.p.h. and climbing hills of 1 in 12 unaided. The constructor is only 16 years old, and is still at school.



A working model whale gun, ½ in. scale, by Mr. W. C. Gay

A petrol engine of 2½ c.c., of original design, is entered by Mr. J. Allen of Barnardiston, Suffolk. This is of the 4-stroke type, with side valves, and is water-cooled. It is built from scrap material, most of the parts being machined from the solid, and the cams and gears are cut by hand.

Mr. R. G. Howlett, of Rochester, has entered a 15 c.c. "Kittiwake" 4-stroke air-cooled engine, a pre-war "M.E." design which is still extremely popular for model power boats and similar purposes.

Brian Jenkinson, of Barnsley, exhibits a 1 c.c. compression ignition engine to a design published in the *Model Maker* in 1952

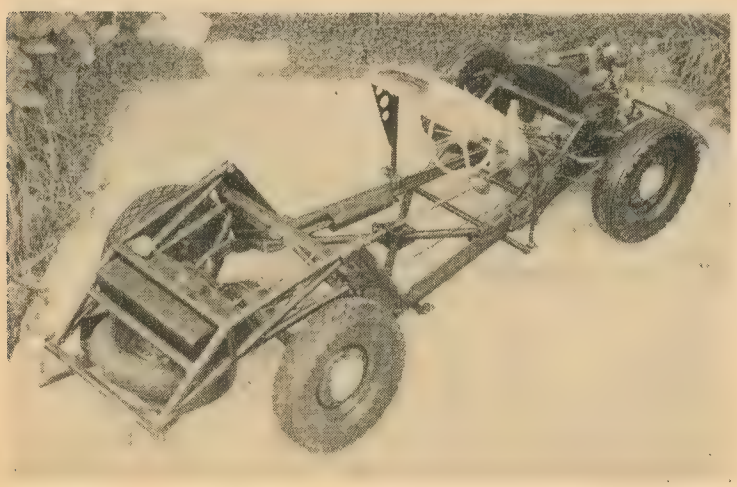
Tools and Equipment

Milling attachments and other accessories for lathes are always popular in this section, and a favourite in recent years has been the Universal Dividing Head, designed by Mr. A. R. Turpin, and described in THE MODEL ENGINEER. An example of this device is exhibited this year by Mr. R. S. Shute of Chippenham. It differs from previous exhibits of this type in being made entirely without the use of castings. It might be described as a good example of the "swords into ploughshares" technique, as many of the parts have been obtained from guns, armour plate and solid practice bombs, which were relics of Home Guard activities.

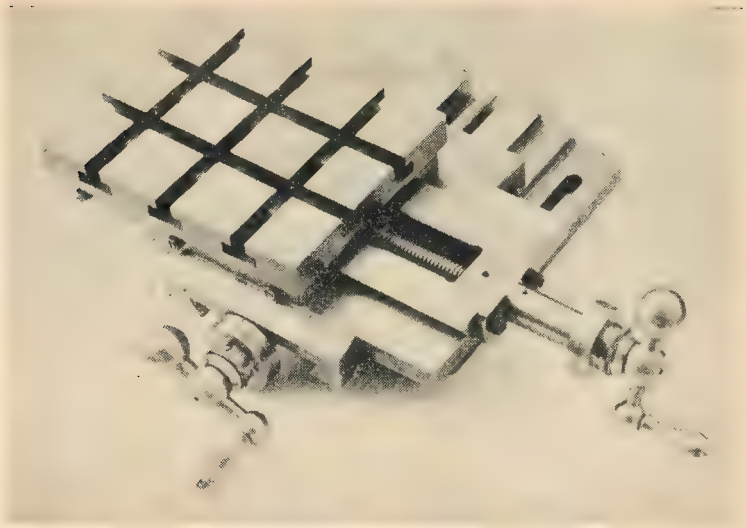
Mr. A. E. Kerswell, of Bristol, who is chiefly known for his model power boat activities, exhibits a compound slide-rest intended for use in a drilling machine. This again is made without using castings, being machined from a solid block of cast-iron which was originally 8 in. × 9 in. × 5 in., the latter dimension being sufficient to make both the main components by cutting it through the centre of the thickness.

Precision measuring instruments have proved to be well within the capacity of the amateur constructor, and this year an example of a 0-1-in. micrometer of standard type is entered by Mr. P. J. Risley of New Southgate, London, N.11.

The able and self-reliant model



A detailed model car chassis of original design, by Mr. W. G. P. de Basagoiti



Mr. A. E. Kerswell's compound slide-rest

engineer who undertakes to construct his own lathe is again in evidence, exemplified on this occasion by three entries, the first of which, by Mr. C. W. Tidy of Sutton, Surrey, being a 2½-in. instrument lathe of individual design, though the patterns for several of the main castings were originally made by Mr. S. R. Harris of the S.M.E.E. the remainder being made by the constructor. The lathe is equipped with a milling spindle, which is a modified version of the cutter head for the " Duplex " engraving machine.

Mr. T. E. Featherstone, of Maidstone, has constructed a 1½-in. centre lathe with self-acting feed and provision for screw-cutting. It has a T-slotted cross-slide, fully compound top-slide, and a division plate attached to the driving pulley. The machine (see page 178, August 12th issue) entered by Mr. P. Gates, of Tottenham, is an ingenious combination of lathe and drilling machine, and embodies several interesting features to make it equally suitable for both purposes. It has a hardened steel spindle running in a lapped cast-iron bearing sleeve, and this is driven by a vee pulley having a hardened steel bush and rotating on the outside of the cast-iron sleeve, so that the spindle is unaffected by side pull of the driving belt. The spindle is equipped with collets, incorporating an original and improved method of operation.

Mr. F. G. Bettles, of Taunton, has produced a " Duplex " engraving machine as described recently in THE MODEL ENGINEER, the patterns for castings being of his own make.

A jigsaw machine to the " M.E." design has been entered by Mr. A. Ashby, of Doncaster.

A pressure gauge calibrator and tester of the type described in the issue of THE MODEL ENGINEER dated December 24th last is exhibited by Mr. M. E. Moon of Holloway. This device, which is extremely useful for many purposes in steam, pneumatic and hydraulic engineering, has been made entirely from scrap, and a gauge is fitted to enable the machine to be demonstrated.

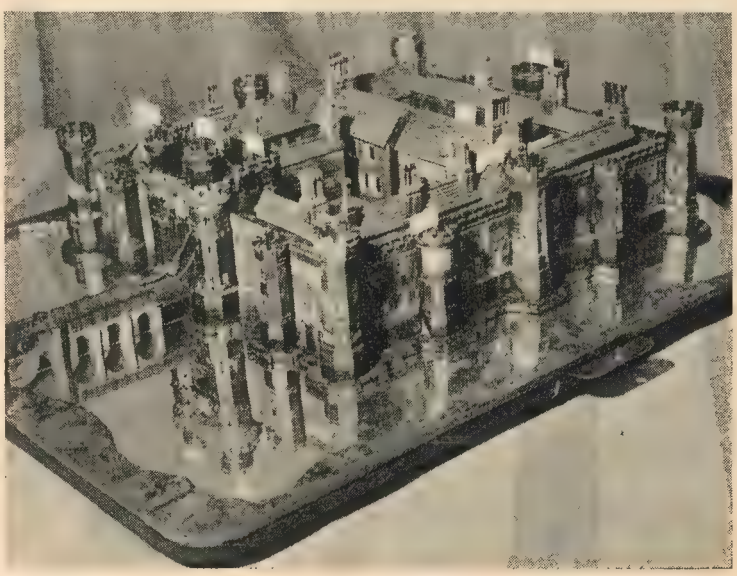
Scenic and Representation Models

M. Henri Chauvaux, a London chef, who has exhibited several models in past " M.E." Exhibitions, has this year produced a scale model of the light-house " Tour de Cordouan." The original of this, which is on a small island at Gironde off the coast of France, is a building which was started in 1584, and was not completed until 1610.

A model of Herstmonceux Castle is entered by Mr. A. R. Horsley, of Davyhulme, and an interesting feature of this particular model is that it is entirely machine-cut on a 3½-in. centre lathe, from scrap pieces of *lignum vitae*. It may be mentioned that Herstmonceux Castle is now the new home of the Royal Observatory, which has been transferred from Greenwich.

Another past exhibitor in this section, Mr. H. E. Dear, has entered a model of Greensted Church, Chipping Ongar, Essex. The model was made from information obtained from sketches and photographs. This church was built in the year A.D. 950 and is the only church in the country in which the side walls consist of the trunks of oak trees split down the centre and roughly hewn. The tower is of timber, and the chancel of old English brick. An aperture cut in one of the wall timbers is believed to be a leper's squint-hole.

A panoramic model depicting the historic first flight of the Wright Bros. at Kitty Hawk, South Carolina, in December 1903, is entered by



A model of Herstmonceax Castle, by Mr. A. R. Horsley

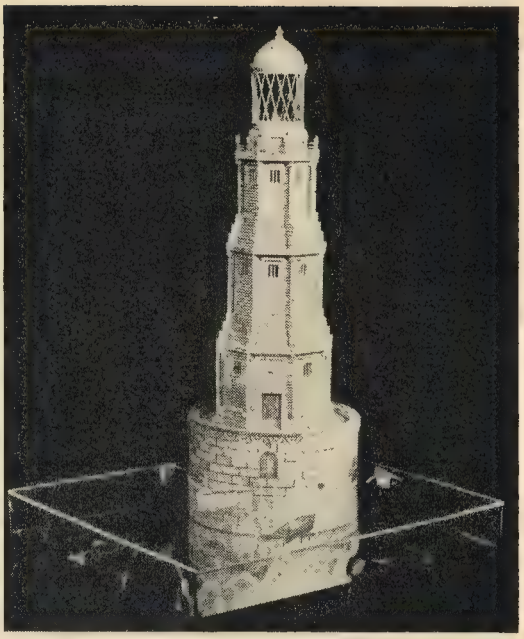
H. J. H. Modderman, of Amersterdam. It includes modelled figures not only of Orville and Wilbur Wright, but also John T. Daniels, W. S. Dough, A. D. Etheridge, W. C. Brinkley and the boy John Moore, who were witnesses of this flight. The scale of the model is 1/50.

Horological and Scientific Apparatus

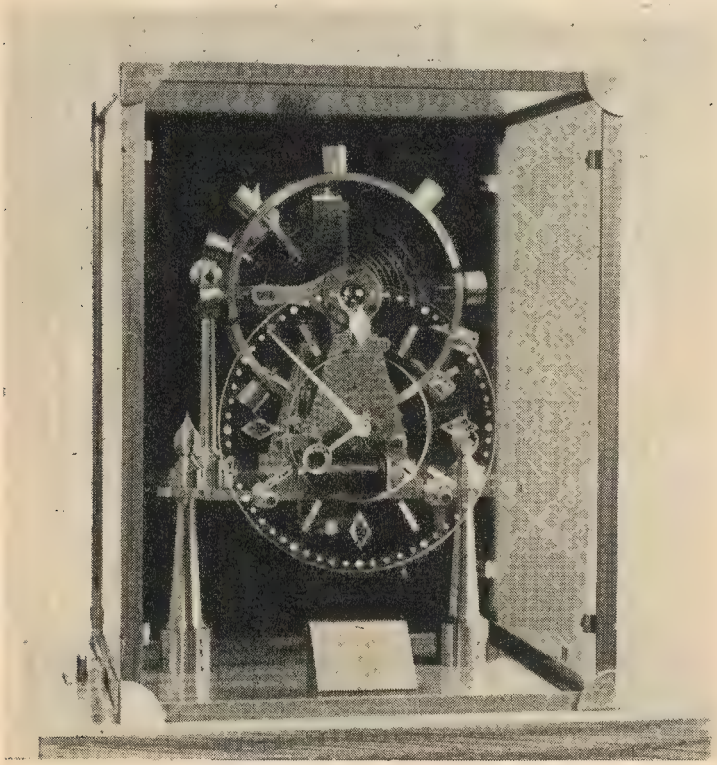
Electric clocks are always popular in this section, and interesting exhibits of this type include the two electric battery clocks with semi-free balance, exhibited by Mr. W. E. C. Garlick of Grimsby, and Mr. J. W. Ramsbotham of Acton, W.4. These are made from a design published in THE MODEL ENGINEER in 1949 by Mr. S. J. Wise, but the former incorporates certain modifications; it occupied about two years in construction, and involved a certain amount of experimental work, including winding the coils three times by hand before the correct results were obtained.

Mr. A. E. Bowyer-Lowe of Letchworth, a well-known past exhibitor in this and other sections of the Exhibition, has entered a ½-second Hipp type electric clock of original design, but suggested by a clock shown by Mr. J. Price at the 1952 'M.E.' Exhibition. New features in this clock include constant travel of the driving pawl, irrespective of the amplitude of the pendulum swing, and also thermal compensation of both the pendulum and the magnet suspension, so that the magnetic air gap is maintained exactly constant.

An electrically-wound Skeleton Clock is exhibited by Mr. G. J. Warren, of London, N.17. The motion of the clock is of fairly normal design, with dead-beat escapement and pin pallets. The characteristic open type frame is used, with a pierced nickel-plated dial and pierced steel hands. The power for rewinding is supplied by a 4.5 dry battery.



M. Henri Chauvaux, a London chef, has entered this model of the Tour de Cordouan lighthouse



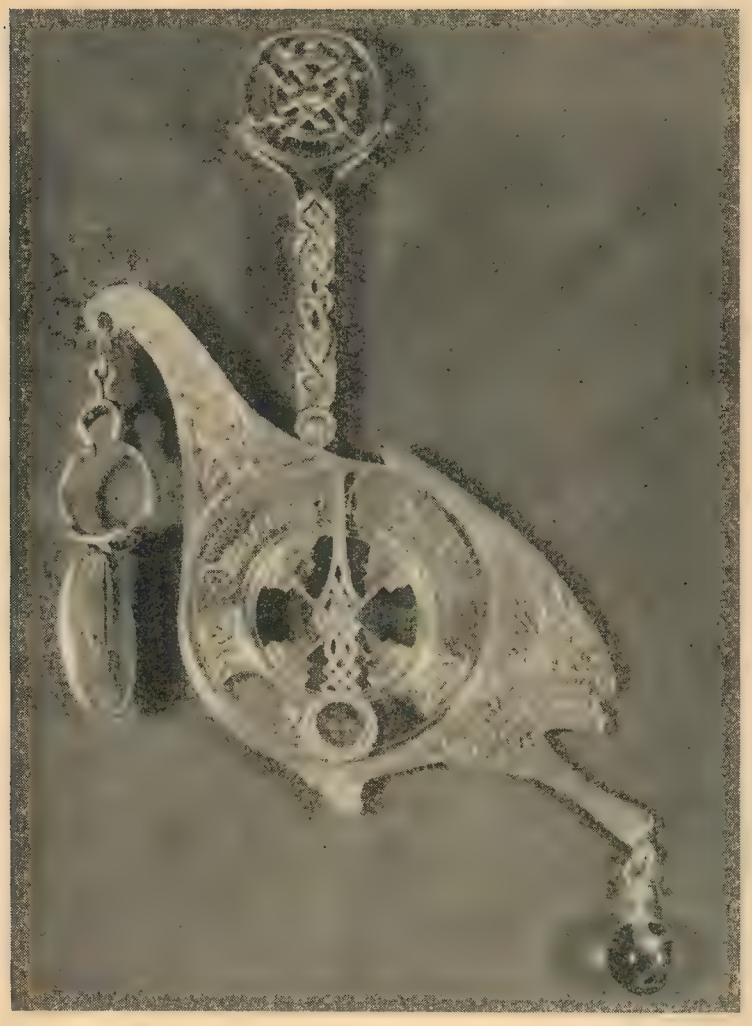
An electric clock with semi-free balance, built to the design of Mr. S. J. Wise, in the "M.E.," by Mr. W. E. C. Garlick

An antique style in the design of a weighing instrument is introduced in the letter scale by Mr. E. C. Woods of Bowness-on-Windermere. This is of the direct-reading type, with a rotating dial and is provided with a clip to hold the letter or other object being weighed. A fixed weight is attached to the other end of the scale beam, but owing to the variation in the movement of the weight of the two arms, a fairly wide range can be covered without readjusting the weight.

Research instruments are represented by the device for testing radio crystals for wave-length, by Mr. L. C. Glen-Barber of Coulsden.

General Craftsmanship

As usual, the exhibits in this section are extremely varied. There are, once again, some novel types of models including musical instruments as exemplified by Mr. V. H. Washer, namely a harp, banjo, guitar, mandoline and a bass violin, also sports implements as exemplified by the model billiard table and accessories by Mr. W. L. Lucking of Robertsbridge. The latter is made of the correct materials as in full-size practice, including maho-



The antique letter balance, by Mr. E. C. Woods

gany frame and slate bed. The legs, cues and billiard balls are all hand turned.

Mr. J. H. Bywater, of Bristol, Naval Leading Seaman, has entered full-scale models of two firearms, namely the Walker-Colt revolver of 1846, .375 calibre, and a Colt .45 revolver of 1873, made from photographs and exploded drawings in American magazines.

A model of a jobbing carpenter's workshop, including the bench tools and figure of the operator is entered by Mr. G. Malins of South Ruislip. (See heading photograph, page 208).

Among novel exhibits in this section may be mentioned a match-stick model of a Southern Railway 2-6-4 locomotive *River Avon* by Mr. D. Jakes of Amersham. A bottled model of a man operating a lathe including working electric motive-power by Mr. N. D. Brooks is exhibited, and also a working model cinema proscenium with remote control by Mr. R. G. Howlett of Rochester.

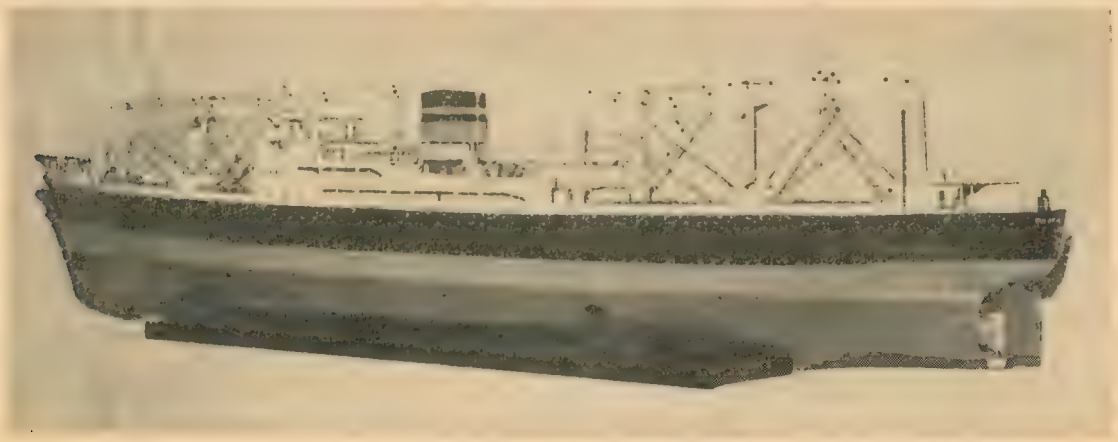
Marine Section

In the non-working Model Steamer class the accent in this year's Exhibition is on naval vessels. Perhaps the fine drawings of naval vessels from the board of Norman Ough which have been appearing in *Ships and Ship Models* have had something to do with this. It is an undoubted fact that where reliable drawings with authentic detail of a particular ship or type of ship are available, the model maker is greatly influenced toward making a model of that ship. And until recently no detailed drawings of naval ships were available. The Admiralty drawings for 50 ft. to the inch waterline models are rather deficient in detail although they are useful in furnishing the correct general proportions of the ships they represent. Mr. F. W. Crudass who won the Steamship class cup in 1951 has again tackled a naval subject, this time a model of a corvette in dry dock at Portsmouth during wartime. From the photograph this will be seen to be a very realistic model with all the gear and materials lying around and the dock yard crane in the background. A model such as this gives great scope for artistry. Mr. A. C. A. Keevil of Warlingham, Surrey has entered a $\frac{1}{16}$ in. scale model of H.M.S. *Dido* made to plans purchased from Norman Ough and reproduced in *Model Ships and Power Boats* in February 1953. Another model of a *Dido* class cruiser, H.M.S. *Euryalus* has been entered by Mr. R. E. S. Kemp of Gillingham, Kent. Mr. Kemp is a draughtsman and seems to have intimate knowledge of the prototype, and as both his model and Mr. Keevils's H.M.S. *Dido* are to the same scale it will be interesting to compare them. Other naval vessels to be represented are a troop landing craft and the atomic submarine recently built in the United States. There is one cargo liner in this section this year, a very good looking model of *Penang* made from the design which appeared in THE MODEL ENGINEER during 1947. The builder, Mr. F. W. Ridgway of Chadwell Heath, Essex, has made models, mostly of aircraft, for the past 20 years, but this is his first attempt at ship modelling. From the photograph reproduced in last week's issue, it appears to be a very successful one. The section also includes two motor fishing vessels.

Next to the miniatures the largest section this year is that of the Model Steamers and Power Driven Craft. The increase in numbers is due to the relatively large number of cabin cruisers entered, more than half of them being of this type. Radio-control has perhaps a good deal to do with this, as at least one-third of the entries are radio controlled. The outstanding model in this section so far as one can see from the photographs is the 5 ft. model of *Pacific Reliance* by Mr. Wm. Brogan of Hastings whose model of the British Railways steamer *Arnhem* at the 1951 Exhibition will be remembered. The hull is of tinplate and the model as a whole is beautifully proportioned, as

will be seen from the photograph. It is electrically driven. The ocean-going tug *Zwarte Zee* by Mr. Wm. Robinson of Brockley Cross and the Mersey Tug *Yorkgarth* by R. T. Judd of Birmingham are also electrically driven. If the latter is up to the standard of the same builder's coaster *Eleftheria* which won the Wellingham Cup in the 1951 Exhibition it will be well worth looking at. Mr. C. R. Smith of the Southend Club sends a fine model of the G.S.N. motor vessel *Royal Sovereign*, which is also electrically driven. One of the few steam driven vessels this year is the 4 ft. model of the ocean tug *Dolphin* entered by Mr. J. V. Fallaize of Harrow. The scarcity of steamers seems a pity as, in a large model there is ample space for a steam plant, and for many types the steam plant is much more appropriate and realistic. Another steamer which we look forward to seeing is the trawler *Gleaner* entered by Mr. W. L. Jennings of Andover, Hants. This is steered by radio-control. We have frequently advocated the modern steam trawler as a prototype for a model. They are very handsome ships and their proportions and robust fittings reproduce well in a model. Mr. K. A. Slade of Rochester, Kent, has entered a nice model of the well-known paddle steamer *Royal Eagle*. As our photograph shows, she is nicely proportioned and looks very effective on the water. The model, even to the paddle wheels, is constructed entirely of cardboard and is electrically driven. From Mr. C. J. Mickleburgh of Wood Green Lane, N.22, we have received a model of s.s. *Gulistan*, a modern cargo vessel. This is driven by a Stuart Turner steam engine, and as it is 5 ft. 7 in. long, should be a very impressive model. Apart from a destroyer, a Fairmile submarine chaser, and an air sea rescue launch, practically all the remaining models in this class are of the cabin cruiser type, and most of them are radio-controlled. One of the most noteworthy is Mr. H. R. Clayton's model *Geebaa III*. Mr. Clayton's *Geebaa I* was exhibited in our 1952 Exhibition, and was a feature in our Demonstration Tank last year. *Geebaa II* was a radio-controlled auxiliary sloop and won a diploma in last year's Exhibition. It will be interesting to see how the new model compares with the older one. From the photograph which we reproduce

Corvette in dry dock at Portsmouth, a realistic model by F. W. Crudass, Wimbledon



A five-foot working model of the Cargo Liner " Pacific Reliance " by Wm. Brogan, of Hastings

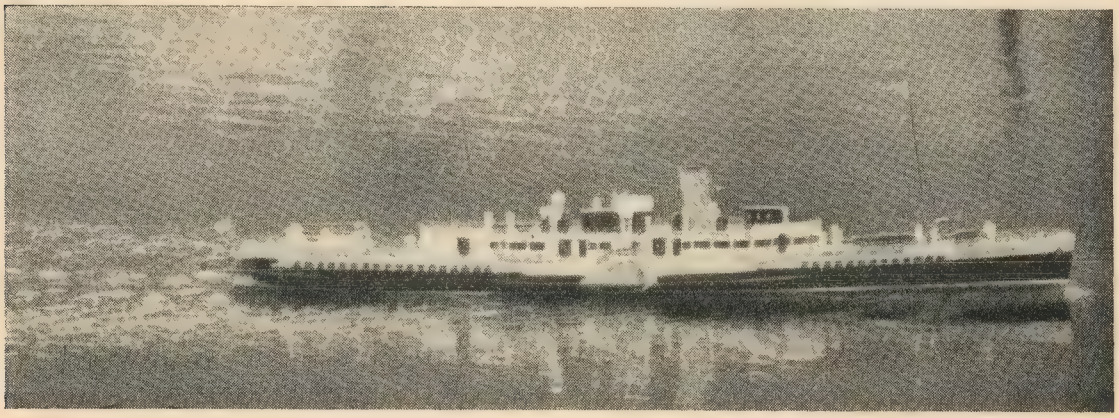
H. R. Clayton's radio controlled model cruiser " Geebaa III

it will be seen to be a smart looking craft. The Walton type cabin cruiser *Regina II* sent in by Mr. G. L. Jones of Hackney seems, from a photograph we have received, to be a fine model, with nice proportions and detail, and a high degree of finish.

Working models of yachts and sailing ships are well represented this year. There is only one example of a racing yacht, due largely to the fact of the Exhibition being held in August, right in the middle of the racing season—which is also the reason why the racing hydroplane is represented by only one example, a Class " B " with 15 c.c. glow-plug engine by Mr. M. de B. Daly of Sydenham, S.26. The yacht in question is a 10-rater and has been built on the rib and plank system by Mr. J. E. Storey of Clapton. Although Mr. Storey has poor health and spends much of his time in hospital he is a skilled craftsman and, knowing his work from previous exhibitions, we are sure this will be a good model. Mr. A. J. Lench of Fulham has sent in a model of the 3-mast barque *Harriet McGregor* The original vessel, although of only 331 tons register, sailed regularly between London and Tasmania for 25 years. The model has simplified rigging for sailing—with which we are in the fullest agreement. Another interesting model is that of the steel barque *Vilia* entered by Mr. L. H. King of Hayling Island. In this model also, the rigging has been simplified and the masts rotate with the yards, the lower masts and topmasts being in one, as was the case in some of the later square-riggers. To save appearances, the tops are loose on the masts and are held square to the ship by the shrouds.

Mr. P. Blanchot of Chiswick has entered a 3-mast barquentine *Isabelle* and Mr. B. J. Haddock of Reading sends a model of *Valerian* the well-known Brixham trawler. Mr. C. M. Hill of Gravesend has sent a model brig, planked on frames. Remembering his spritsail barge which we described in *Model Ships and Power Boats* in August of last year, we expect this model will be a good job. J. J. Starkey of Southend-on-Sea has sent in a spritsail barge *Kathleen* and Mr. H. D. Aldridge of the same club has entered a similar model. These were both entered in the Hove Regatta, and are two of the six models which were built all to the same scale for that event. Mr. D. C. Eyles of North Finchley has entered his schooner *Valkyrie* which sailed so well in last year's prototype regatta at Hove. Mr. C. V. Thompson of West Kensington has sent in a group of small yachts from 1 in. long and upwards. Presumably he sails these in a photograph developing dish, as he did his clipper in a recent Exhibition. One of the most interesting of the sailing models is that of a quarter size 14 ft. sailing dinghy made by Mr. Kenneth F. New of Rochester, Kent, a shipwright's apprentice. From a photograph we have received this is a very completely detailed model and embodies much of the builder's professional skill and knowledge.

We have 35 entries in the Miniature Section, only three short of the entries in the 1952 Exhibition which is the record to date. One of these is from a lady, the only lady competitor in the Exhibition. This is a model of the 4-mast barque *Herzogin Cecilie*, made from the instructions in the pre-war *Ships and Ship Models*, by Mrs. V. A. Barry, of Cape Town, who is living in England temporarily. Mr. A. E.



An electrically driven model paddle steamer " Royal Eagle," by K. A. Slade, of Rochester, Kent

Field of Streetly, Staffs, who has twice won the Championship Cup for Sailing Ships, has joined the miniaturists this year with his two models of 30 ft. lifeboats to ¼-in. scale. We believe he has been inspired by Mr. G. H. Draper of Ilford who has entered four clinker-built ships boats of naval types dating from 1774 to 1923. Between them they are producing some magnificent models. These are especially interesting, as ship's boats have been very much neglected in the past, and they afford splendid material for careful modelling. Mr. E. N. Taylor of Gosport, whose work we have often seen and admired, has entered a scenic water-line model of the Ellerman liner *Tasso*. Plans were supplied by the builders and details are based on photographs and sketches made on board during a voyage to Sweden. Mr. R. Carpenter, of Brighton, another of our regular competitors, sends in two models, one, the Ellerman liner M.V. *Temple Hall*, and the other the passenger-cargo liner M.V. *Chilka*. We reproduce a photograph of the latter model which will give the reader some idea of its excellent proportions and abundant detail. Mr. E. C. Freeston, secretary of the Wembley Ship Model Society, has sent in a model of the brigantine *Marie Celeste* shown as she was when found deserted in mid-ocean. Mr. Freeston has made a special study of the *Marie Celeste* story, and his model will be examined with interest. Mr. C. Seston of Southall, Middlesex, has made a model of the Tribal class destroyer *Matabele* to the scale of 50 ft. = 1 in., from the drawings by Norman Ough published in *Ships and Ship Models* last March, which we will be interested to see. Mr. J. L. H. Patterson a medical practitioner of Edgware, sends in two models, one of the *Cutty Sark*, planked on frames with some planking left off to show the frames, and the other of a yacht of the late 17th century. Mr. M. H. A. Kempster of Bristol has entered a 30 ft. = 1 in. scale model of the 4-mast barque *Archibald Russell* made to the Percival Marshall book. The secretary of the Bristol Club, Mr. A. Ralls, has sent two entries, one a scenic model of the Great Lakes freighter *Hochelaga*. He has named his second entry *Quartet in A Minor Scale*, as it consists of four models to 100 ft. scale in a small cutlery case. These are from drawings in the shipbuilding magazines, and we look forward to seeing them. Mr. C. I. Rooke of Orpington, Kent, also sends in two models, one of the Everard M.V. *Selectivity* and the other of the G.S.N. Company's M.V. *Auk* both to the scale of 30 ft. = 1 in. The miniature Third Rate of 1670 by Mr. H. F. Milne of South Norwood, S.E.25 should be an interesting model, being made from information obtained from the Science Museum, South Kensington.

Mr. S. Wurr of the Wembley Ship Model Society is quite an authority on spritsail barges and we look forward to seeing his model of one which has become an auxiliary. To a lover of the sailing barges they look rather pathetic when cut down as auxiliaries. Mr. E. Baynes Rock who is 85 years of age, and is, therefore, our oldest exhibitor this year, has entered four models which he has made within the last two or three years. These include a model built last year of a yacht which he and a friend built and sailed in 1895/6, a model of a Venetian fishing boat, which he has just completed, a model of a Thames barge made in 1951, and a model of a topsail schooner, made in 1951/52. It is good to see a man of this age still making ship models, and for him to be able to undertake the fine detail work involved. Mr. R. H. Harknett of the Thames Shiplovers' Society has entered a rib-and-plank model of a service whaler, built of bristol board to the scale of ¼-in. = 1 ft. There are two bottle models in this year, one of the traditional type by Mr. A. Spraggon of the Hammersmith Ship Model Society, and the other showing a brig and an early auxiliary paddle steamer both in one bottle. This is by Mr. J. H. Fisher of Greenford, Middlesex, and should be a change from the usual model of this type. This does not complete the list of models but will suffice to give the visitor to the Exhibition some idea of what awaits him.

The tank this year is 25 ft. square, which is quite a bit larger than last year's tank, and owing to the progress in radio control made during the year, the operations on it should be more interesting than ever. The demonstration stand will exhibit the usual features, and in addition we hope to show hull construction in fibre glass and in gummed paper strip. The ship-modeller is very well catered for this year and there will be lots to interest him whatever his special line may be.

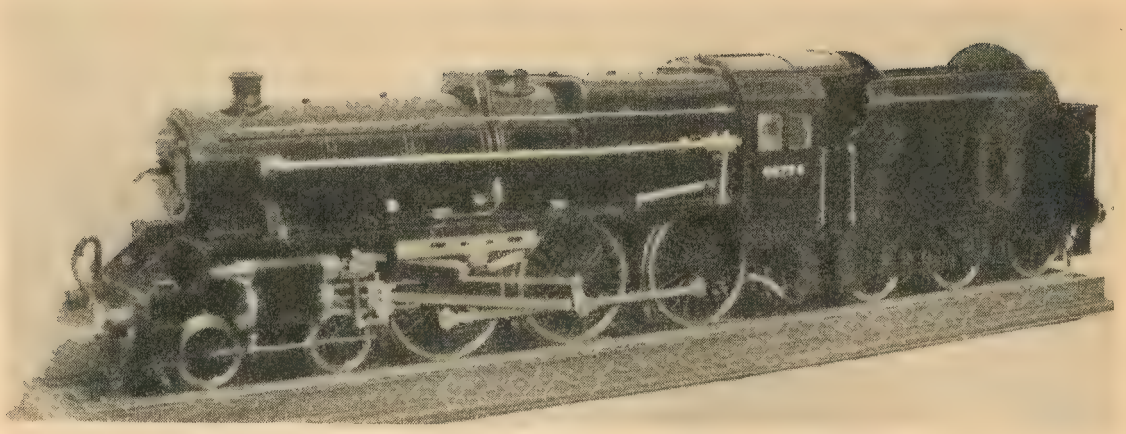
Locomotives

In the rolling-stock section, Mr. P. C. Coutanche figures again, with a model of a family saloon as built at Ashford for the S.E.C.R. in 1900; it is in 7-mm. scale, to match the 0-4-4 tank engine.

In 4-mm. scale, both "OO" and "EM" gauges are about equally represented. Mr. R. Booth of Wimbledon has sent in a model of the old Highland Rly. 0-6-0 *Lochgorm*, a very small prototype to reproduce in so small a scale.

Mr. H. R. King has made a 4-mm. scale model of L.M.S.R. engine No

A beautiful miniature W. L. model of M.V. "Chilka," by R. Carpenter, of Brighton



¾-in. scale L.M.S. Class 5 engine made by an engine-driver, Mr. A. H. Parrott

6103, *Royal Scots Fusilier*, of the rebuilt "Royal Scot" class; he has done it "on the kitchen table," using a simple small lathe and hand-tools.

Mr. R. J. B. King, whose "EM"-gauge locomotives have aroused much admiration in recent years, is this year represented by a model of a steam railcar as built for the Great North of Scotland Railway in 1905

Mr. C. T. Standfast of Ilford, another excellent worker in 4-mm. scale, has sought inspiration in an old favourite, the Southern Railway's Drummond "T9" class 4-4-0 engine as rebuilt by Urie and painted in standard S.R. style.

The American "19S/516" class 2-8-0 locomotive, as used exclusively in France, Italy and on the Continent during the war, is the basis of a "OO"-gauge model made by Mr. C. Hibbit of London, S.E.3.

Mr. W. T. Dolley of London, N.W.10, shows a 4-mm. scale model of a Class "7," 4-cylinder 4-6-2 engine of the L.M.S.R. "Coronation" class.

A varied selection of rolling-stock in 4-mm. scale is to be seen; it includes a London and North Western Railway 50-ft. luggage van as built at Wolverton between 1900 and 1908. The typical raised mouldings of the prototype vehicle are all represented.

Mr. D. E. H. Birse of Seven Kings is known as an indefatigable worker for "EM"-gauge, and is a stickler for accuracy; to illustrate this, he exhibits six different types of G.W.R. "Toplight" coaches, each one with its characteristic features represented. Commerical kits and components have been utilised, but adapted and altered where necessary to achieve correct detail. This exhibit would seem to be something of an object-lesson in variations in models.

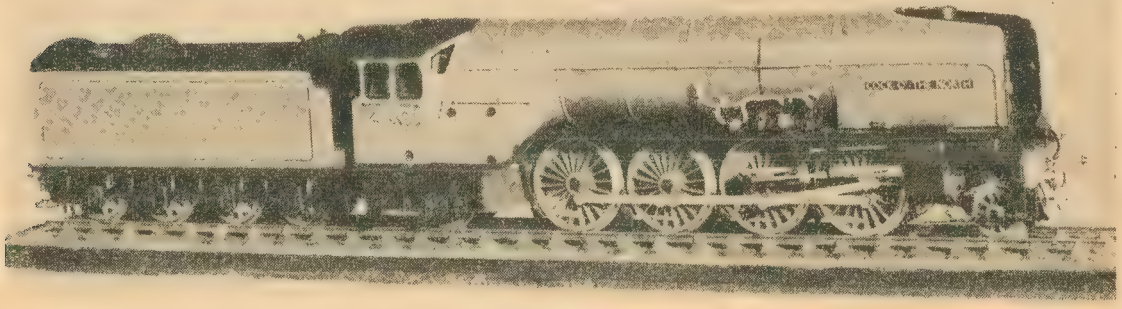
A somewhat similar exhibit, by Mr. F. Hill of London, S.W.1, consists of a collection of pre-war G.W.R. main-line rolling-stock, eight different vehicles in all, built to Mr. Hill's own ideas of construction.

The mechanically-propelled road vehicles section contains some interesting items. Mr. Harry Grayson of Chatham shows a simple free-lance road roller, based on one illustrated and described in THE MODEL ENGINEER for December 6th, 1951. It is fitted with a twin-cylinder engine of Mr. Grayson's own design and is spirit-fired.

Mr. E. J. Baughen of Wimbledon exhibits a sort of "Bill Massive" free-lance traction engine of his own design. It is 3 ft. 7 in. long, weighs 1¼ cwt., and was built specially for doing hard work. It has been known to run non-stop for five hours, generating light.

A 1½-in. scale Burrell 7-n.h.p. general-purpose traction engine by two brothers, H. R. and G. A. Plastow of Enfield, has been built as a result of a visit to the 1952 "M.E." Exhibition, at which the two brothers, then aged 24 and 13 respectively, were very much impressed. Their model was begun immediately afterwards.

Mr. W. R. Finch of Potters Bar is showing a ¾-in. scale, non-working model of the 3.3-litre Grand Prix Bugatti racing car made from drawings and photographs.

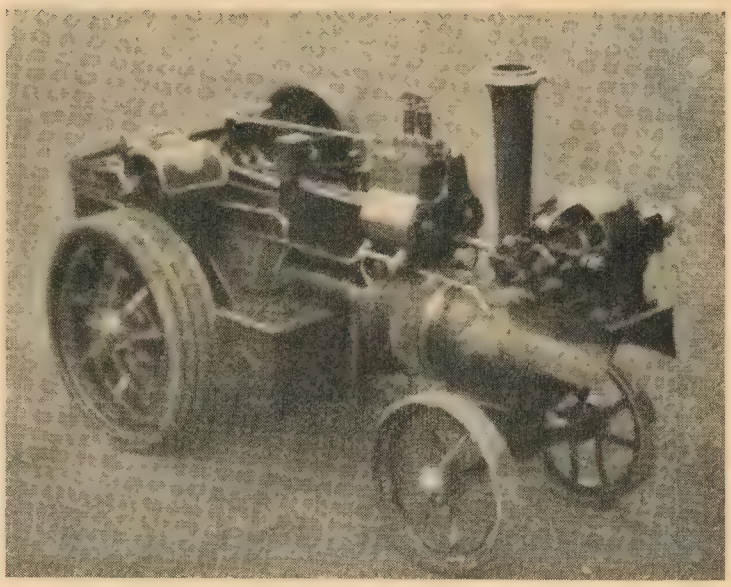


The former "Cock o' the North" of the L.N.E.R. reproduced in 4-mm. scale by Mr. F. Reynolds

Although there are people who have their own ideas about car design, it is not many who put those ideas into the solid. Mr. W. G. P. de Basagoiti of Nether Stowey, Somerset, however, has translated a new idea for a car into a model which is certain to attract the attention of visitors who are motorists.

Probably few of the millions of cyclists in this country have seen Macmillan's bicycle in the Science Museum, South Kensington, or are aware that it was the first to drive on to the rear wheel. Mr. R. E. Brook of Hildenborough, Kent, has modelled this historic machine to ¼ full-size, taking his details from the original machine and reproducing, exactly to scale, such features as the wooden frame, wheelwright-built wheels, metal tyres and twist-handlegrip brakes.

At the moment of writing, only one locomotive has been entered in the Junior section; it is based on "L.B.S.C.'s" 3½-in. gauge *Rainhill*, but has been enlarged to suit 5-in. gauge by its builder, Master Bryan Miller of Workington, who is aged 15½. The enlargement seems to have been done without in any way upsetting the general proportions or appearance of the engine, and the result is very pleasing.



Mr. E. J. Baughen's "duty-not-beauty" free-lance traction engine

THE LOAN SECTION

THIS section provides an opportunity for the display of exhibits that, for one reason or another, are not included in the Competition. The work may be incomplete, or it may have been in the Competition section at previous exhibitions, or it may be something of historical interest and never intended for competition. But models of every type, finished or unfinished are always welcome as Loan exhibits, and inspection of them is always at least instructive.

Among the locomotive exhibits on loan this year is an extremely interesting model electric locomotive lent by Mr. David Coombs of London, S.W.20. It was built in 1908 by Mr. Coombs' father, H. N. Coombs, and was the subject of an article in THE MODEL ENGINEER soon afterwards.

An unfinished 5-in. gauge passenger-hauling model of the old Liverpool and Manchester 0-4-2 engine, *Lion*, (alias *Titfield Thunderbolt*) by Mr. L. B. Parkin of West Drayton, is based on the L.B.S.C. serial, but with slight differences due to the engine being finished first. Some nice workmanship has been put into it.

Mr. T. W. Geary of London, W.4, has lent the chassis and boiler for a steam locomotive for "O" gauge. It incorporates a new type of valve-gear, and the big-ends are fitted with ball-bearings. The boiler is equipped with water circulators, and the whole model seems to be of quite an unusual nature in so small a scale.

Mr. T. S. Gibbons, who has made a special study of hot air engines for many years, has acquired the spirit-fired hot air engine built by the late Mr. Mark Wyer, and described in THE MODEL ENGINEER in 1951, and has entered it in this section. This engine, which resembles the Robinson type in general design, is very well made and finished, and is mounted on the top of a rectangular furnace, with chimney, fire door and other fittings.

The handsome and efficient electric clocks which have been designed and described in THE MODEL ENGINEER by Mr. C. R. Jones, of Winchester, have been very popular with constructors, several of them having appeared at past exhibitions. This year, Mr. Jones has loaned his latest clock, a descriptive article on which is due to appear in THE MODEL ENGINEER as soon as circumstances permit.

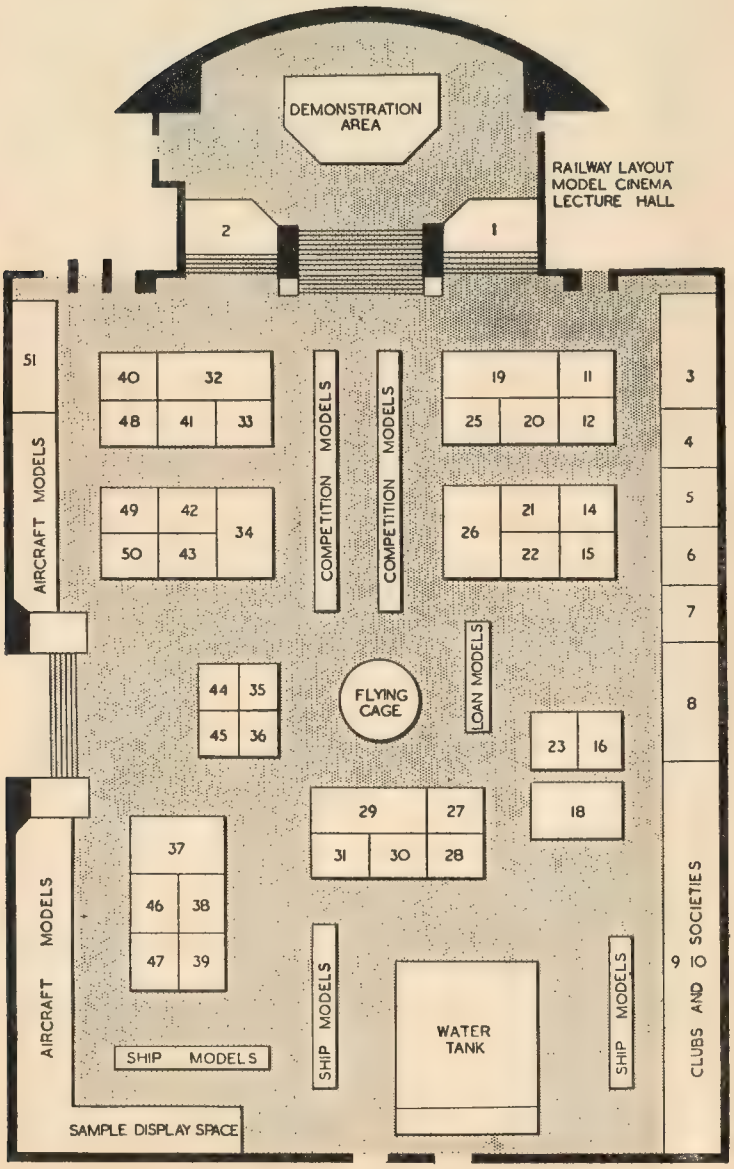
Lt.-Commander Craine ("Jason") has lent a very fine prisoner-of-war model of an 18-gun ship. The hull which is only 8 in. long is finished in bone and tortoise shell, and the rigging is in excellent condition.

Mr. I. W. Marsh is at present working on a model of the famous tea clipper *Ariel*. The hull is finished and may be seen in the loan section. The deck plan has entailed a lot of research work but Mr. Marsh's model is as nearly correct as we are likely to get, seeing no contemporary plans of the ship are known to exist.

There are two miniatures in this section, both of ships of the Restoration period. One is of the ship H.M.S. *Prince* of 1670 by Mr. Chas. Hampshire and the other is of the Royal Yacht *Fubbs* of 1682 by Mr. Donald McNarry. A comparison will be extremely interesting, as their builders are without a doubt the leading exponents of the art of miniature ship modelling.

THE MODEL ENGINEER EXHIBITION

ALPHABETICAL LIST OF EXHIBITORS AND GUIDE TO THE TRADE STANDS



	Stand Nos.
Air Ministry (Information Division)	28
Black & Decker Ltd	43 & 50
Bold & Burrows	32
S. N. Bridges & Co. Ltd	1
Buck & Ryan Ltd	19
Chloride Batteries, Ltd	2
R. J. Deaves & Co.	49
T. S. Harrison & Sons Ltd	11
Heller & Sons (Engineers) Ltd	14 & 21
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Robert Wills
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Winchester Engineering Co. (Edmonton)

THE MODEL ENGINEER EXHIBITION

TRADE STANDS

Associated Iliffe Press, Dorset House, Stamford Street, London, S.E.1.

The publications of this firm, which include the periodicals *Flight*, *The Autocar*, *The Motor Cycle*, *Wireless World*, *Yachting World*, and *Amateur Photographer*, are displayed on this stand, together with up-to-date technical books embracing a wide range of engineering subjects.

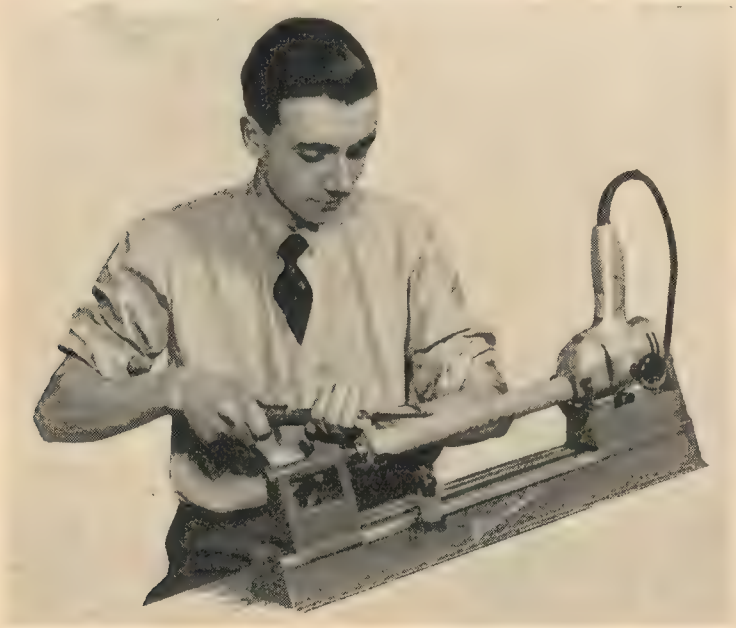
Black and Decker Ltd, Harmondsworth, Middlesex.

The complete range of Handy Utility power tools, including ¼ in. and ⅛ in. electric drills, 5 in. sander-polisher, orbital sander, and 6-in. circular saw, may be seen on this stand. A new feature for use in conjunction with the ¼-in. drill is the Black & Decker Craftsman lathe, which appears this year for the first time, and will be demonstrated, together with its attachments and accessories.

Bold & Burrows, 12-18, Verulam Road, St. Albans, Herts.

Among the tools and equipment displayed on this stand, special mention may be made of the "Picador Pup" multi-purpose machine, which enables many operations to be performed on wood and light metals, including turning, sawing, sanding, grinding and drilling. It embodies a tubular bed 24 in. long on which is mounted a headstock carrying a ⅝ in. diameter spindle, running in graphite impregnated self-lubricating bushes, threaded r.h. and l.h. on the ends, and fitted with a driving pulley for vee-belt; on this can be mounted a faceplate, driving centre, sanding disc, grinding wheel or circular saw. A sanding table with tilting adjustment, also a saw table with fence and safety guard, a turning hand rest or grinding rest, and adjustable tailstock are supplied. The machine is intended to be driven by a ¼ h.p. motor.

A full range of other "Picador" products, including a new bench stand to take electric hand drills, and a variable-speed driving unit, will be included in the display.



The Black & Decker Craftsman lathe, powered by the ¼-in. Handy Utility Electric Drill

S. N. Bridges & Co. Ltd, Parsons Green Lane, London, S.W.6.

The principal feature of this display is the new Toolpower electric drill and its accessories, which make their first "M.E." Exhibition appearance this year. This appliance comprises a light and efficient ¼ in. capacity hand-drill of entirely individual design and unusual range of versatility, together with fittings which enable it to be converted to a power lathe, drilling machine, grinder, sander or power saw. In its portable form, it can also be adapted as a floor polisher, and a multiple-shear hedge trimmer is also available to fit the drill chuck.

The machine incorporates a Universal motor, made to suit voltages

from 110 to 250 d.c. or single-phase a.c. 25 to 50 cycles, with gear drive to the drill spindle, which runs at 1,400 to 2,000 r.p.m., and is fitted with a geared drill chuck of the Jacob's type. The weight of the complete hand tool is 4 lb. 1 oz.

The full range of accessories can be seen on the stand and demonstrations are given throughout the period of the Exhibitoin.

Braid Bros., 50, Birchwood Avenue, Hackbridge, Surrey.

The components and accessories for home construction of refrigerators, which are the speciality of this firm, will be seen here. They include complete refrigeration units of both absorption and compressor types, and individual components such as expansion valves, thermostats, cabinet fittings and accessories, condensers, evaporators, etc., together with literature on refrigerator construction, and everything necessary to build domestic refrigerators of all types.

Another feature of this display is the range of components for constructing the "Busy Bee" 50 c.c. auxiliary cycle motor and the "Bumble Bee" 50 c.c. stationary engine, both of which have been full described in THE MODEL ENGINEER and are of proved efficiency and reliability. The sets include all castings and materials for construction, together with finished carburettors, magnetos, sparking plugs, piston rings, etc.

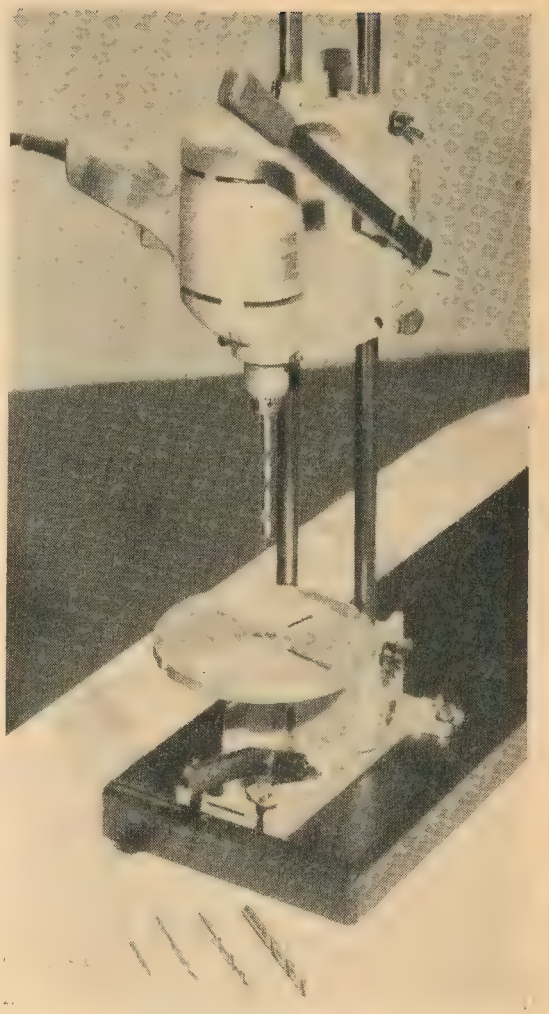
Buck & Ryan Ltd, 310-312, Euston Road, London, N.W.1.

A regular exhibitor since the very earliest days of the "M.E." Exhibition, this firm never fails to produce an attractive display of tools and equipment especially suited to the requirements of the model engineer. Their display this year includes a selection of the latest types of lathes, drilling machines, shapers, power tools, measuring instruments and hand tools. Two items of special interest this year are the Burnerd "Grip-tru" self-centring chuck and the Burnerd interchangeable lathe toolholder. The former consists of an orthodox geared scroll chuck, built to the usual Burnerd standard of precision, but with the addition of a new patented micrometer adjustment which enables even the smallest errors in concentricity to be eliminated.

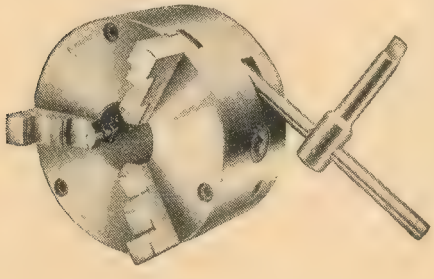
The toolholder, which is made in a form to suit the Myford and Boxford lathes, provides a means of setting or resetting tools accurately and quickly, and is complete with four tool bits, one parting tool, one boring bar and one "slave" toolholder.

Chloride Batteries Ltd, Clifton, Junction, Swinton, Manchester.

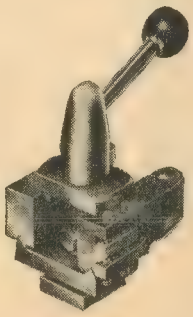
The well-known Drydex dry batteries and Exide miniature accumulators, and their application to models either as propulsive power or for operating radio-control mechanism, are shown on this stand. These batteries combine maximum capacity with minimum bulk and weight, and constitute a clean, handy and compact source of power for all kinds of small motors, also lighting and signalling purposes.



The Bridges Toolpower electric hand-drill, adapted as a sensitive drilling machine



The Burnerd "Grip-tru" chuck with fine adjustment device



The Burnerd patent universal lathe toolholder

R. J. Deaves, 57, Tennyson Road, Small Heath, Birmingham, 10.

A frequent exhibitor at this Exhibition, Mr. Deaves will again demonstrate an ingenious combined tool for sharpening knives, scissors and other cutlery, and for cutting plate or sheet glass, Opalite, Vitriolite etc.

"Engineer Apprentice," 65/66, Chancery Lane, London, W.C.2.

The journal *Engineer Apprentice* which is featured on this stand is a monthly illustrated magazine in-

tended particularly to assist the engineering student or apprentice. It contains articles dealing with lathe work, general engineering practice, mechanical drawing and other practical subjects.

T. S. Harrison & Sons Ltd, Union Street, Heckmondwike, Yorks.

The Box-Ford machine tool products are featured on this stand, and now include various types and sizes of lathes from 3 in. to 4½ in. centres The 4½-in. screwcutting lathe is made in various forms, and many accessories and attachments are available, including fixed and travelling steadies, collet sets, turret head, milling attachment, boring table, and dividing head. A recent development applicable to the 4½-in. lathe is the hydro-pneumatic copying attachment for semi-automatic production work.

Plain precision lathes of 3-in. and 4½-in. centres are available, also a 3½ in. light capstan lathe. The well-known Box-Ford comparator gauges, reading in increments of either 0.001 in. or 0.0001 in., with various types of stands for bench and test-bed mounting, also sine plates, parallels, etc., are on view. Several other products are in course of development.

Heller & Sons (Engineers) Ltd, Turnpike Lane, London, N.8.

This firm exhibits the small abrasive band polisher which was reviewed in THE MODEL ENGINEER two or three years ago. It consists of a light and compact bench machine with a pulley for vee-belt drive from a lineshaft or separate motor, driving an abrasive band with vertical working face. A horizontal work table, with tilting adjustment is fitted, also an adjustable back support to take the working pressure when dealing with straight surfaces. Bands of various grades for use on wood or metal are supplied, and can be changed instantly without the use of tools.

Other products of this firm include stamps and stencils of all types and sizes, including rubber monogram stamps.

W. Kennedy Ltd, Station Works, West Drayton, Middlesex.

This firm is well known for the ingenious bending-tools which have been demonstrated at prevous "M.E." Exhibitions, and are now used in many amateur and professional workshops. These will again be featured, together with the new Kennedy portable power hacksaw, which will cut bars or tubes up to 2 in. diameter, though weighing only 40 lb. and occupying a space of 22 in. × 10 in. × 7½ in., completely motorised. It is also obtainable fitted with a vee pulley, to be driven by separate motor or lineshaft in which form it weighs only 15 lb., and the dimensions are 17½ in. × 6 in. × 5½ in.

Kennion Bros. (Hertford) Ltd, 2 & 2a, Railway Place, Hertford.

This firm need no introduction to our readers; in previous years, their stand has always attracted crowds. Practically every need of the model engineer, in the way of small tools, taps, dies, metal sections, locomotive castings and materials, is to be found there; any visitors requiring such items should not fail to enquire of Kennion Bros. From time to time, during the exhibition, Mr. Charles Kennion will be in attendance at the Demonstration stand, showing how to do small brazing jobs, the spelters and fluxes for which are procurable from the Kennion stand.

On the Sample Display stand will be found some examples of the products of **Hamblings Ltd,** 10, Cecil Court, London, W.C.2, the specialists in "OO"-gauge model railway components; **W. Waugh,** 31-Hillfoot Drive, Bearsden, Glasgow, will be showing some of his latest castings and parts for live-steam locomotives as described by, "L.B.S.C.", and **Robt. Wills,** 92 Brighton Road, Coulsdon, has on show the well-known Kennedy bogies and a new range of "O"-gauge model railway fittings and parts.

William Levene Ltd, 30a, Sackville Street, London, W.1.

A number of useful and instructive devices are demonstrated on this stand, including a pantograph for copying and enlarging drawings, and a new liquid plastic material which can be moulded to any shape or blown into "permanent" bubbles.

Ernest T. Mant, The Mill House, Wigginton, nr. Banbury, Oxon.

The "Cuboid" glass display cases, for housing models, or for general exhibition purposes, are featured here. They are obtainable in oak, walnut and mahogany, in all sizes and with various bases.

Percival Marshall & Co. Ltd, 19-20, Noel Street, London, W.1.

This stand is devoted to the journals and technical books with which all readers of THE MODEL ENGINEER are familiar. Over 150 different technical books are displayed, covering every aspect of model engineering and small workshop practice, together with plans and working drawings for a wide range of model ships, locomotives, aircraft, cars, steam and i.c. engines and workshop accessories, totalling over 300 designs.

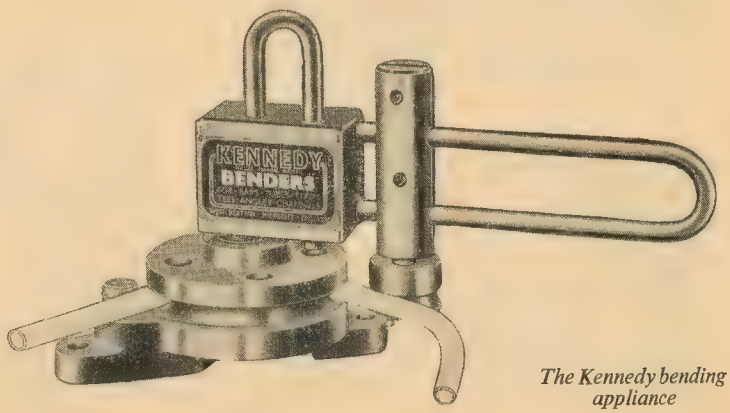
Meccano Ltd, Binns Road, Liverpool.

The principal feature of the display by Meccano Ltd., will be an extensive Hornby-Dublo gauge "OO" electric railway layout.

The Hornby-Dublo system operates on d.c. at 12-volts and trains can be run from mains supply or from batteries. In either case the system is completely safe and reliable.

It is notable for remote control, powerful all-metal locomotives (fitted with suppressors), automatic coupling and uncoupling of wagons and coaches, and locomotives and rolling stock in B.R. liveries.

The sturdy, well designed Hornby-Dublo track components and line-



The Kennedy bending appliance

side accessories enable the most comprehensive layouts to be built up in comparatively small space.

A range of new Meccano models and a colourful selection of the popular Dinky Toys will supplement the Hornby-Dublo exhibit.

" The Model Engineer," 19-20, Noel Street, London, W.1.

This stand has been set aside to serve as a rendezvous and enquiry bureau, where readers may leave messages or queries to be dealt with by the Editorial staff, or make appointments. Many readers take advantage of the Exhibition to meet old friends or make new ones, and it is hoped that the provision of a meeting place will facilitate contacts of this kind.

Munster Chemical Co., 226, Munster Road, London, S.W.6.

Demonstrations are given on this stand of " Cromit," a new plating preparation which can be used either for restoring old and worn plated articles or for plating new articles; and " Silvit " for cleaning silver and restoring it to original condition without abrasion or scratching.

H. D. Murray Ltd, Queensway, Ponders End, Middlesex.

This stand features the well-known " Reliance " tools in which the above firm has specialised for many years, including drill chucks, collets, lathe centres, socket spanners, and thread dressing tools. The " Reliance " twist drill grinding jig, which enables drills of any size to be ground exactly to the correct cutting angles, will be shown and its use demonstrated throughout the Exhibition.

Myford Engineering Co. Ltd, Neville Works, Beeston, Nottingham.

The products of this firm are so well known in model engineering and light industry as to need no introduction to our readers. The M.L.7 3½-in. lathe, which was first exhibited in 1946, is still the most popular machine tool in the home workshop, and is now supplemented, but by no means superseded, by the " Super-7 3½-in. lathe, which has been designed to meet the requirements of high speed and heavier duty in the same dimensional capacity. Its outstanding features include a range of 14 spindle speeds, from 25 to 2,180 r.p.m., clutch-controlled; ejector type tailstock with ball thrust and quick-acting multi-start thread; extra large boring table on cross-slide, with long travel, and index dials, with friction setting on top and cross-slide feed-screws.

The M.L.8 lathe, with its numerous accessories, forming a complete universal woodworking machine, is also well known and has recently been reviewed in this journal. Separate woodworking machines, evolved from the experience with these attachments, are now available, and include the P.R.11 bench planer, which has a three-bladed rotor running at 4,000 r.p.m., on heavy duty roller bearings, and is capable of planing up to a width of 4½ in. or rebating to a depth of ½ in. All these machines and accessories are demonstrated working, and an expert staff is available to answer any questions relating to their use or applications.

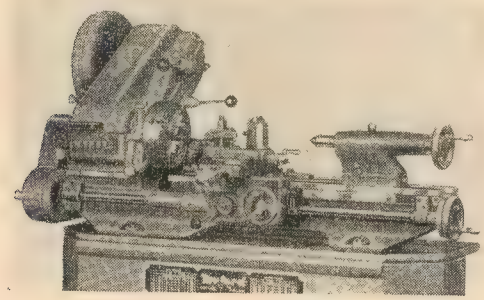
John M. Perkins & Smith, Ltd, London Road Works, Braunston, nr. Rugby.

The " Mason Master " drills demonstrated at this stand are tipped with tungsten carbide and will deal with the hardest materials, including brickwork, stone, or concrete, and in conjunction with plastic " Masoplugs," simplify the task of securing fittings to walls and other structures.

The " Glazemaster " drill will produce clean round holes in glass, vitriolite, china, glazed tiles, etc. Another interesting product is a range of stonemason's saws for cutting or channelling stone or brickwork.

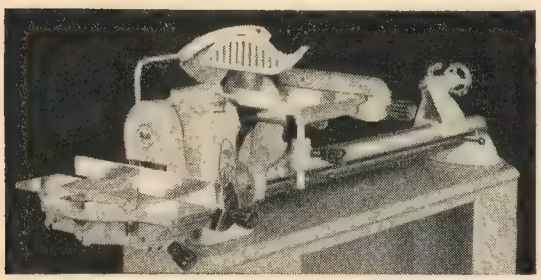
Phillips Omnipool Ltd, 406, Euston Road, London, N.W.1.

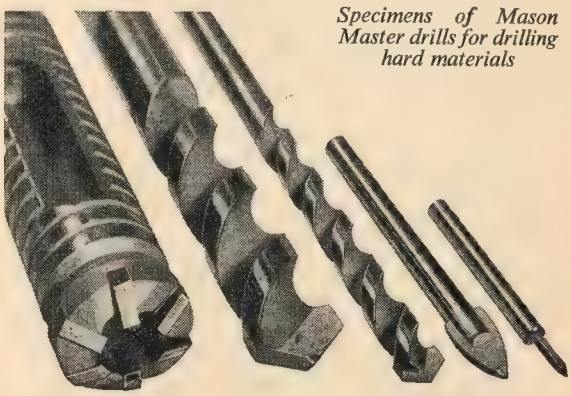
The well-known " Multicraft " tools which are the speciality of this firm now include the Precision Cutter equipped with four different-shaped blades, which can be housed inside the handle when not in use, together with other useful accessories; and the Junior Knife, with one double-ended blade, also housed in the handle. Three attractive outfits, the " Major," the " Cadet," and a new pocket kit in a leather-grained plastic holder, are featured in this display.



Left: The Myford " Super 7 " 3½ in. lathe

Below, left: The ML8 lathe, with planer and circular saw attachments fitted





Specimens of Mason Master drills for drilling hard materials

One of the popular Multicraft kits

Philplug Products Ltd, 343, High Road, Wembley, Middlesex.

This stand features devices for drilling bricks, stone, marble, tiles, etc., including the Philplug diamond-point drill, which is tipped with tungsten carbide, and has a universal shank enabling it to be used in a wheel brace, carpenter's brace, or electric drill. For fixing screws in the above materials, "Screwfix" composition, made from asbestos fibres and special cement powder, provides instant security and is unaffected by either heat or damp.

The Rawlplug Co. Ltd, Rawlplug House, Cromwell Road, S.W.7.

Samples of the well-known Rawlplug products, including Durofix and Duroglue adhesives, plastic wood and wall plugs, also tools for drilling stone, brickwork and concrete, by percussion or rotary motion, are featured in this exhibit.

H. Rollet & Co. Ltd, 6, Chesham Place, London, S.W.1.

The speciality of this firm is the supply of non-ferrous metals, including brass, copper, gunmetal, phosphor bronze, also aluminium alloys. A scale model of a section of the company's warehouses, showing some of the 3,000 sizes of material kept in stock, also part of the cutting machinery installed for cutting bars, sheets and strips. Samples from the wide range of materials are displayed, and can be purchased at the stand in any quantity, however small.

Ross & Alexander (London) Ltd, 165/167, Bishop Street, London, E.C.2.

This firm is exhibiting a range of high-class machinery including *Randa*, *Myford*, *Granville*, *Boxford* lathes, power drilling machines and Shapers, etc., etc.

Spiral Saws, Ltd, 8b, Bedford Avenue, Slough Trading Estate, Bucks.

The Tyler spiral saws, and their application to either hand or machine use, are demonstrated at this stand. These saws consist of a specially tempered steel wire with a spiral cutting edge, which will cut equally well in any direction, and negotiate the tightest curves, or even sharp corners. They can be fitted to any type of frame, including coping saws, fretsaws or hacksaws, with the aid of special adaptors, and are also available in the form of endless bands to fit the special Tyler bandsaw machine, which is demonstrated in use, cutting materials.

Sprayt, 226, Munster Road, London, S.W.6.

The "Sprayt" equipment includes a very simple and inexpensive spray gun, which will work from a tyre pump or other source of air pressure, and special cellulose lacquers obtainable in a wide range of colours and will give a high gloss finish by spraying. Kits containing all the necessary materials for spraying new surfaces or renovating old one, are obtainable, and demonstrations of these products are given daily.

The Web Model Fitting Co., 204, High Road, Wood Green, N.22.

This firm handles a large range of fittings for marine models of all types, from steam plants, boiler fittings and propellers, down to the smallest deck details. These are in a great variety of sizes to suit models in different scales, and having seen them on many models for several years past we can recommend them with every confidence.

The Wolf Cub drill set up on vertical stand for use as a sensitive drilling machine

Werner Laurie Ltd, 1, Doughty Street, London, W.C.2.

This firm's display features on of their latest books " Model Jets and Rockets for Boys."

Wilmac Products, Milton Mill, Whins of Milton, Stirling.

This display consists of woodworking machinery, including the " Wilmac " circular saw bench, with 10 in. tilting table, and rise and fall spindle adjustment, also the " Wilmac " 12-in. bandsaw, and other items of equipment for home craftsmen.

Wilmot, Mansour & Co. Ltd, Salisbury Road, Totton, Southampton.

A wide range of model aircraft, boats and cars powered by Jetex jet motors is featured on this firm's stand. These include a ready-to-fly model of a Delta wing interceptor fighter and three new " tailored " model aircraft constructional kits —the " Skyway," " Super Sabre " and " Skyrocket " which have preformed fuselages and die-cut balsa wood parts. Also shown are a number of new products which will be available shortly, in addition to the well established range of Jetex motors and accessories.

Winchester Engineering Co., 134, Winchester Road, Edmonton, N.9.

This exhibit includes the " W.E.C." 2½ in. dividing head, full particulars of which are not available at the time of going to press; also a dividing attachment for use on the lathe.

Wolf Electric Tools Ltd, Pioneer Works, Hanger Lane, London, W.5.

The well-known Wolf Cub electric hand drill, with its wide range of accessories which comprise the Wolf Cub Home Constructor Equipment, constitutes the features of this display. This machine was a pioneer of the now popular hand power tools, and has stood the test of time; its accessories now include kits for adapting it to form a lathe, drilling machine, fretsaw, grinder, sander and polisher. All these applications are demonstrated throughout the Exhibition.

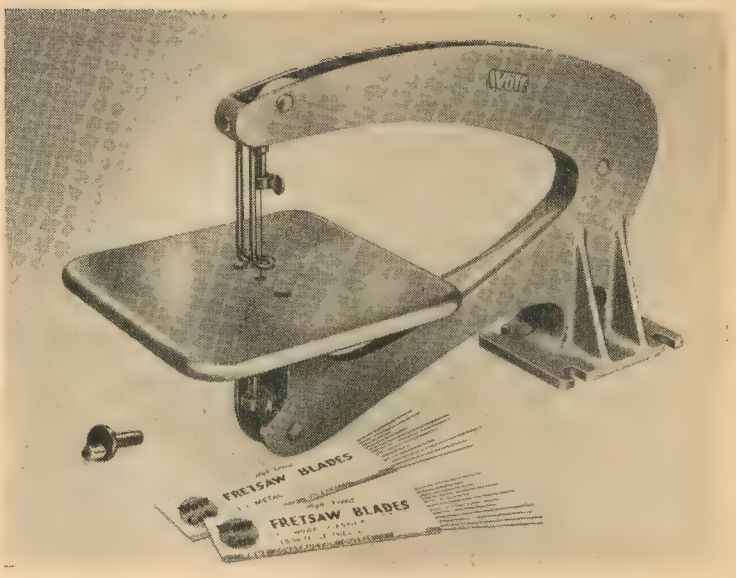
G. &. R. Wrenn, 123, Lee Road, Blackheath, S.E.3.

This firm will be exhibiting on Stand 31 a full range of ready-made products from their very well-known range of " OO " gauge trackwork and accessories for permanent model railway layouts. The most interesting items are the newer Universal types. Utilising this type of pointwork together with their flexible track, it is possible to mix and run together all the well-known proprietary types of locomotives and rolling stock, including Trix, Hornby, Rovex, Farish, Marklin, etc. Due to the nature of the design, embodying continuous support for the wheels at the frogs, the smoothest possible running is guaranteed.

Utilising Wrenn products it is possible for beginners and modellers alike to construct realistic and reliable miniature replicas of real-life railways, at a moderate cost.

Visitors will be able to inspect a layout constructed from Universal items, on which the majority of the well-known proprietary locomotives will be seen in operation. Any railway modeller who may wish to build up his rolling stock from the range of more than one manufacturer, cannot fail to appreciate the advantage of this feature.

Messrs. Wrenn are hoping to show prototypes of one or two new items, being planned for production in the new season.



The Wolf Cub fretsaw attachment

THE "M.E." MAY HELP

Mr. R. S. Minchin, Publicity Officer of the Society of Model and Experimental Engineers, Western Australia, writes to say that he knows that booksellers in Perth, W. A. distribute copies of THE MODEL ENGINEER to many people in addition to members of his society, and there may be some who would welcome the opportunity of meeting others with similar interests.

The society's members are certainly typical of the fraternity; meetings are held every first Wednesday of the month at the Railway Institute, Wellington Street, Perth, at 8 p.m.; most of the members are regular readers of THE MODEL ENGINEER, Mr. J. H. Lang, the society's late president, having taken it since 1907. Five locomotives are under construction, ranging from 2½-in. to 7¼-in. gauges, and there are four completed. One member is constructing a 3½-in. gauge continuous track about 800 ft. in circumference; one is building his own lathe, and another has recently finished a universal milling machine. There is also an interest in marine and stationary models, while three members have hydroplanes which showed encouraging progress last summer. Mr. Minchin adds that the society is small in numbers, but is none the less proud to belong to that worldwide brotherhood which THE MODEL ENGINEER has fostered. We shall feel proud if we prove to be the means of putting some " lone hand " Western Australian readers in contact with the society.

L.B.S.C.'s Lobby Chat

• OVERCOMING DIFFICULTIES

THOSE good but misguided folk who are for ever blaming lack of equipment and facilities for their inability to turn out a well-made and efficient little locomotive, might do worse than follow the good example of the builder of the engine illustrated in the reproduced photograph. This very worthy person, whose first name ought to be Job, but isn't—actually he is Mr. Winsby Walker, Motive Power Superintendent, Moncton (New Brunswick), Canadian National Railways, started to build her in 1932, and didn't finish her till 1948, and the story of the job is a real epic. It is a tale of patience and perseverance which I should imagine is without parallel, and I guess that our readers will agree, so here it is.

To Do Likewise

Friend Walker is a North-Country Englishman, and way back in his home town, in 1910, he attended an exhibition in which were displayed two small North-Eastern locomotives; one was a 3½-in. gauge Atlantic, and the other a 5-in. gauge 0-6-0. Contemplation of these engines did for our worthy friend, exactly what it has done for many others, viz.: started an earnest desire to "go and do likewise"; but it wasn't possible to make a start right away, as he had no equipment at all. Circumstances, and the Kaiser's war, prevented anything at all being done until the early 1920's; and then, to try to gain some experience, he made a drawing for a two-cylinder stationary engine with Baker valve-gear, like the "works" of a locomotive, and endeavoured to make cylinder castings for it, by aid of the kitchen fire. The net result was a hole burnt in the floor, so that job was abandoned; but the urge to get cracking, still persisted, and in 1927 our friend thought he would try his hand at making a crank axle with the meagre outfit he then possessed. This consisted of a hacksaw, drill, and a few files; but the crank axle came out very well, so he decided to build a stationary engine around it, and did. Everything was hand-built except the piston for the cylinder, which was turned by a friend.

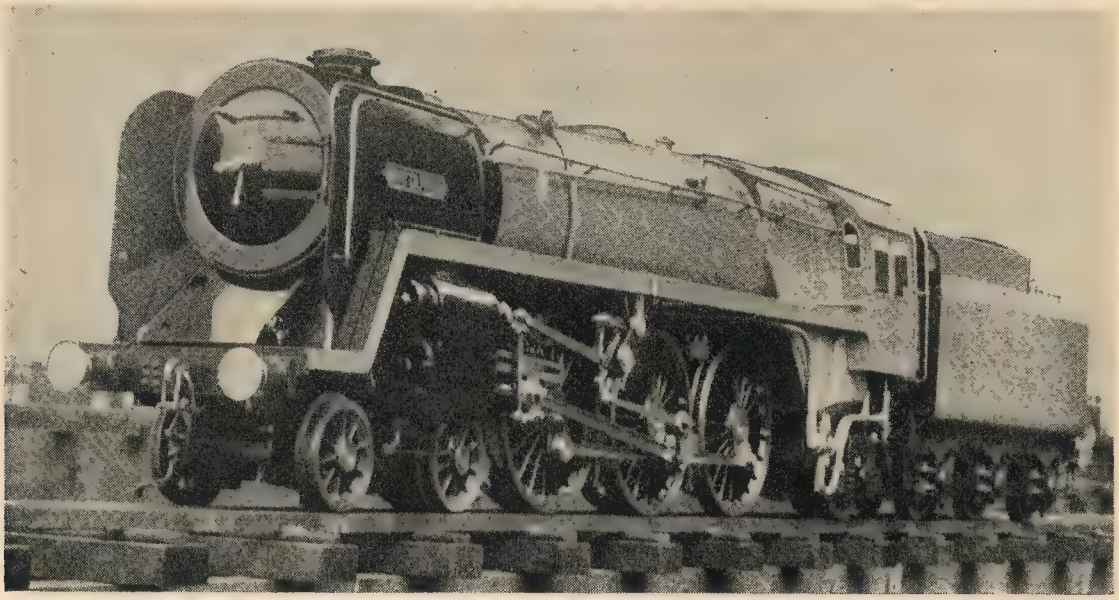
The "M.E." Discovered

By this time, Mr. Walker had discovered this journal, and had become a regular follower of your humble servant's notes; he had also crossed the big pond, and entered the C.N.R. service. Older readers may remember that in the late nineteen-twenties I described and illustrated some of the "super-locomotive" designs by James A. Josslin and Percy Hunt; one of these a suggested L.M.S. Pacific, took our friend's fancy, and remarking to one of his own friends that he could easily be persuaded to start building it, the friend promptly applied the necessary spur; so at long last, the great plunge was taken. At the time, the only tools available were a small vice, hacksaw, drill and a few files. However, before making an actual start, there was one little matter requiring attention. Mr. Walker, as stated above, came from North-Eastern territory, and naturally favoured that company's engines in preference to the L.M.S.-cum-Josslin-Hunt conception; so he altered the outline to suit, substituted an American-type bogie tender, and made some detail drawings. He chose the name *Aerolite* in memory of the little single-wheeler North-Eastern tank engine, which bore the same name, and was the only one of its class ever built.

A Modest Beginning

With his little vice and hand-tools, friend Walker made a start on the bogie, and bought four Stuart-Turner wheels for it, from the firm's Canadian agent. Just at that time, the depression had set in, and many folk were hard put to find sufficient money for the necessities of life,

Mr. Winsby Walker's "Aerolite"



Tom Adlingtons 5-in. gauge " Britannia "

let alone spending any on hobbies, and the purchase of the bogie wheels left our friend without any spare cash for some time. However, things improved in due course, and the next purchase was six driving-wheel castings, which were supplied direct from London by George Kennion. The friend who had spurred on Mr. Walker to start the job, had a 4-in. Drummond lathe, and the wheel castings were turned on that. The only other material purchased especially for the job, was a piece of 3½ in. diameter × 16-gauge copper tube for the boiler barrel, and the copper sheet for the firebox. All the rest of the engine was made from odds and ends picked up from various sources. The cast-iron cylinders were cut from the solid, the metal being part of the grate of a full-sized engine. When the C.N.R. built their first diesel-electric switching engine, steel plate of 12-gauge was used for some of the superstructure; and some offcuts from this, were used for the frames of the little engine. A neighbour whose job was rebuilding and re-modelling soda fountains, was able to furnish sufficient scrap sheet monel metal for the cab, tender, and running-boards. The boiler cleading is made from tinplate which was once fruit-juice cans; and the rounded corners of the top of the Belpaire firebox, once formed part of an Edgeworth tobacco tin. Mr. Walker remarked that he gets his material from the weirdest places, and is certainly correct ! The bogie frames once formed part of a Hudson car; and some useful pieces of 18-gauge sheel sheet were rescued from a load of Montreal Tramways discarded rubbish on its way to the dump !

" Patience is a Virtue "

The boiler throatplate, backhead, and firebox tubeplate were made from 12-gauge copper obtained by opening out odd bits of 1½-in. copper tube. The coupling-rods, connecting-rods, crossheads, and the whole of the valve-gear, were all cut out by hand, the only machine-work being the turned bronze bushes. This work included the Walschaerts expansion links and the die-blocks; even the nuts for crosshead pins, crankpins, and knuckle-pins were hand-made by drilling and tapping holes in bar stock, and finishing with hacksaw and file. Each crosshead took three weeks, working three hours a night; our friend says he won't make any more in that way ! It was done by first chipping the grooves for the guidebars in the two blocks of steel, then drilling, sawing, and filing the recess for the little end of the connecting-rod, and finally filing the outside of the crosshead to shape.

Urgent Need for a Lathe

By this time, the need of a lathe had become a matter of urgency, so when our friend was offered a used machine for fifty dollars, he fell for it by verbal recommendation. It proved no bargain; when he went to use it, he found he had been " sold a pup " as well as a lathe, as it was just about what our American friends call " shot to bits." It had certainly been a good machine at one time, being a " Star " of 5 in. centres, with 36 in. between; but the headstock bearings had been shimmed up with paper, teeth were broken off the gear-wheels, the shift levers had been broken off and brazed, and everything behind the apron was absolutely worn out. To make the machine serviceable, our friend stripped it right down, made new headstock bearings, fitted pegs to replace missing gear teeth, and did a bit of rebushing. It has served ever since, though slow and inefficient. The only chuck available, is one of those awful abominations, a three-jaw independent. I used one of those myself when over in U.S.A., and can vouch for it as being the most darned awkward and clumsy type of chuck ever screwed on to a lathe mandrel. Anyway, despite the limitations of the machine, friend Walker managed to turn and screw the two-start left-hand reversing screw on it, and make a corresponding tap for the nut; and it managed the rest of the turning.

The rest of the job was easy when compared with what had been done. The pony truck and tender wheels were turned from the solid, scrap punchings from a suitable thickness of

steel plate, forming the material. Part of the boiler brazing was done in the workshop of a friend in Montreal, and partly in the Moncton shop when it was closed down on a Saturday afternoon. The fluting of the coupling and connecting-rods was done with a hammer and chisel. One of the twin eccentric-driven pumps as described in these notes, was fitted between the frames and operated from the trailing coupled axle. The rams are $\frac{5}{16}$ in. diameter with a $\frac{3}{8}$-in. stroke. The tender pump is also made to my specification, and the boiler fittings all "Curly standard." The ashpan is an exact copy of the Canadian National Railways standard hopper type, with a bottom door pivoted to swing open and dump the ashes. Friend Walker says that he made an error in not fitting a dump grate as well, as cleaning the fire is an awkward job. The boiler has no combustion-chamber, as our friend was rather dubious about the brazing of it; but nevertheless, the boiler is a satisfactory steamer, and has a two-element superheater made according to my earlier designs. The mechanical lubricator has no ratchet gear, but has two reverse-coiled springs on the lubricator shaft. These will soon be replaced by the usual ratchet arrangement. The beading around the cab and tender, is made from split-pins opened out, hammered flat and soldered on.

Although the start-to-finish time taken to build the locomotive was approximately sixteen years, the actual working time was about $3\frac{1}{2}$ years, which wasn't too bad considering the conditions under which the builder had to work; and he certainly deserves the highest commendation for his effort.

A Fine Worker

Aerolite is an excellent worker; she takes after her builder! She put up an excellent performance on the Lachine track at the Montreal meet in 1948, and has visited various other lines; the photograph was taken by George Murray in August, 1953, when she was running on his road during a visit of the Walker family to the Murrays. For Mr. Walker's kind appreciation of the help received from these notes, I bow very gratefully; but would remind him that instructions are useless unless patience and perseverance, such as he possesses, are there to carry them out. Very few folk, would have managed the job with such meagre facilities; and the locomotive is an outstanding example of "what you can do when you try."

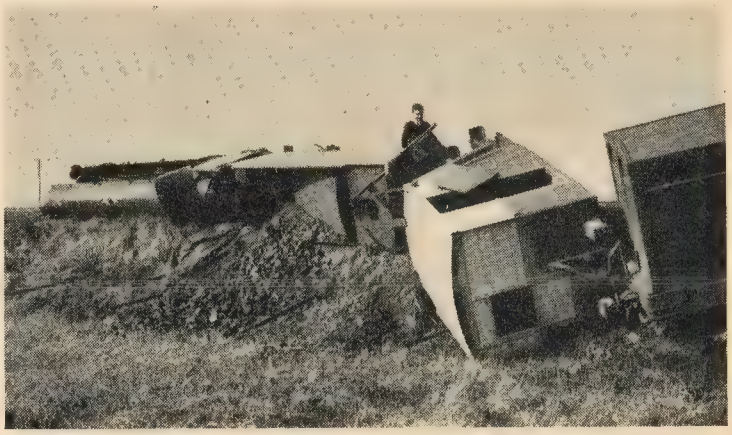
Always Play for Safety!

Regular followers of these notes don't need reminding that I have stressed, again and again, the need for care in using a big blowlamp for boiler-brazing, and always advocate doing the job in the open, wherever possible, and never in a workshop under any circumstances; otherwise everything will go rusty as quickly as a cut apple turns brown. It is also risky to inhale the fumes; and last, but certainly not least, there is the fire risk. I have just received, at time of writing, a letter from a reader who earnestly exhorts me to repeat the warning, for beginners' benefit especially, and to pass on the account of his own experience through not taking sufficient heed.

He was brazing up a *Juliet* boiler in the domestic scullery, when the vaporiser of the 5-pint blowlamp suddenly burst, same as mine did in the Norbury bathroom about twenty years ago. He was not so lucky as I was, for the flame shot backwards, and before he could escape, he was covered in burning spray. He sustained a badly-burned right ear, lesser burns on face, chin, and neck; lost his eyebrows completely, and most of his hair. He said that none of that would have happened if he had been doing the job in the open air as advocated. In my own case, as I recounted at the time, it was only heavy rain that caused me to operate in the bathroom, and I wasn't hurt because I managed to shut the oil valve *hasta pronto*; but from that time on, I never attempted to use a blowlamp indoors again. Experience always teaches!

"Spot-on"—Every Time

Here is an item of news that will tickle those correspondents who frequently raise a moan about the eccentricities—literally!—of their so-called self-centring chucks. Some little time ago I received from Mr. J. R. Tracy, of the Burnerd Co., a sample 4-in. three-jaw with a little bit of something that the others haven't got, viz.: a separate micrometer adjustment to each jaw. Alongside each pinion is a groove, in which is what looks like the head of an Allen screw; one end of the handle of the chuck key has a hexagon formed on it, to fit the socket. If you put a piece of rod in the chuck, and it runs out of truth, all you do, is to apply the end of the chuck key to the adjusting screws, and hey-presto! It is set "spot-on" in a matter of seconds. By aid of an indicator, the work can be set as truly as if held in a precision collet; and all subsequent pieces of similar size, *can be chucked dead true without further adjustment*, giving collet accuracy with three-jaw speed. I fitted the chuck to the new Myford lathe; and up to time of writing, it certainly has proved the cat's whiskers, doing everything the makers claim. I've tried it for holding axles while turning wheel-seats, and for holding piston-rods when finish-turning the pistons; but its greatest value is for holding dead true, work which is far too big to be held in any collet. I hope to return to this subject, and illustrate some locomotive-building jobs in which it has licked the ordinary three-jaw to a frazzle. The Burnerd folk have certainly supplied a want of long standing; as Nola Purvis says on the radio, "Speak as I find, that's my motto!"

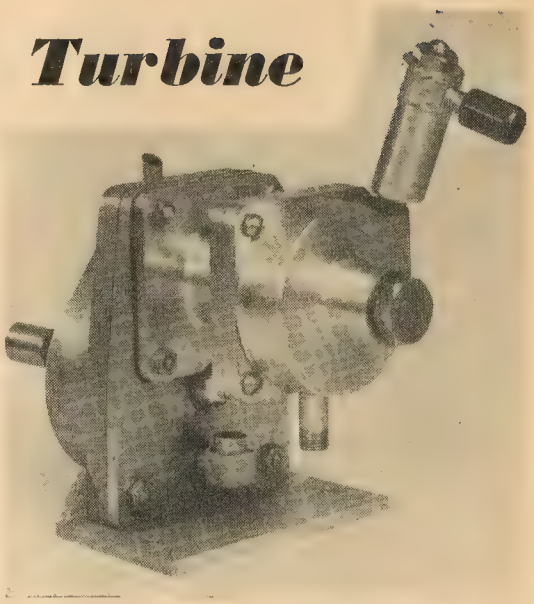


What the gale did to a Romney Hythe & Dymchurch train!

MORE UTILITY STEAM ENGINES

A simple Geared Impulse Turbine

By Edgar T. Westbury



The experimental turbine, constructed from solid and fabricated components

IN the early years of this century, many model engineers were attracted by the possibilities of the steam turbine, which at that time was becoming a serious rival to the reciprocating engine in full-size practice, particularly for ships and electric power generators. Many experiments were made with various types of small turbines by the model fraternity, and THE MODEL ENGINEER organised a competition to encourage the design of this type of engine, the results of which were extremely interesting, and were incorporated in one of the popular " M.E." handbooks. Among the pioneers of model turbine design may be mentioned our old friend Mr. W. Blaney, of the Victoria Model Steamboat Club, and the Rev. W. Bredin Naylor, both of whom entered designs in the above competition.

The early prospects that the steam turbine would become equally popular in model form as in full-size practice, have not, up to the present, been fulfilled. There are several reasons for this; no doubt, like many inventions and scientific developments, the merits of the turbine were over-rated, and to many experimenters it became merely a new toy, to be played with for a time and then discarded. Many light-hearted or haphazard attempts were made to design or apply the turbine without any knowledge or consideration of its particular problems and limitations. At any rate, it is a fact that interest in the development of model steam turbines declined sadly after their initial brief popularity, and although there have been a few notable and worthy experiments made in recent years with these engines, they are not regarded with any great enthusiasm by the majority of model engineers.

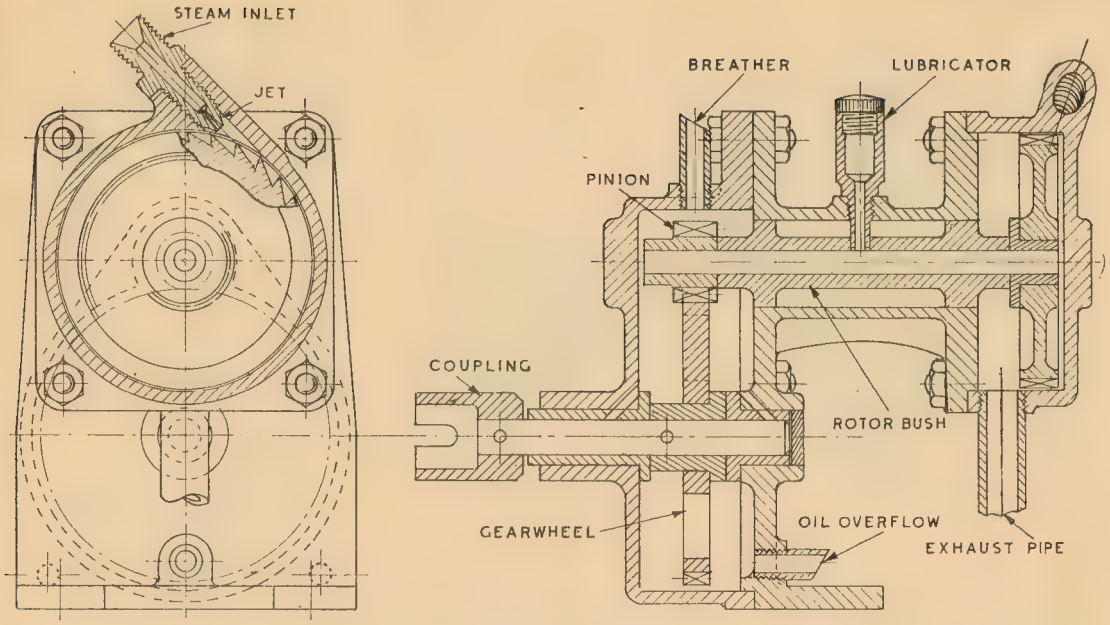
Among the staunch adherents of the model turbine, I may mention Mr. T. W. Geary, who has modelled nearly every form of the full-size turbine, including main and auxiliary engines, turbo-generators, blowers, and pumps, with a praiseworthy regard to their external appearance and character. Mr. Elkin has demonstrated, in practical working models, the efficiency which can be obtained in a tiny impulse turbine by careful study of blade and nozzle design; and this development has been carried still further by Mr. D. H. Chaddock whose models have achieved incredible speed and power. Th eapplication of a turbine to a flash steam hydroplane has been attempted by Mr. Chaddock and Mr. J. A. Bamford, and although their efforts have not been crowned with immediate success, they cannot be written off as failures, any more than the first steam test of the Parsons turbine in the *Turbinia* could be so regarded.

There is indeed one feature of the turbine which may be a deterrent to many model constructors, namely its stark mechanical simplicity, with an almost complete absence of working parts, and I have often heard this cited as a reason why it is not more widely adopted. But the same thing applies, to a greater or less extent, in many other forms of engines and machines which are quite popular in the model world, such as, for instance, the two-stroke i.c. engine, which may have as few as only three moving parts, all of them completely enclosed and hidden from view. Model engineers, and particularly those who are interested mainly in using engines to produce useful power, would not disregard any means of attaining this end if they had faith in its possibilities.

There, I think, is the real snag; the steam turbine is perhaps the easiest engine in the world to make in a simple and primitive form, and to get to *work*, if by that term we mean to buzz round, without being called upon to produce useful power —but it is a very different story when we want something to do a real job of work. Most of us can remember " experiments " with a treacle tin and a sheet metal disc with bent-up blades, which in our raw, but over-confident schoolboy enthusiasm we hailed as a great achievement. But if we were sufficiently interested to carry the experiments further, we found that there was much more in the problem than met the eye.

I have seen several attempts to use simple turbines—generally produced with the aid of tin snips, pliers and soldering bit !—which certainly did not inspire confidence in their possibilities. In some cases, the rotor was mounted directly on the propeller shaft of a boat, open to the four winds of heaven, and the " design " of blades and nozzle looked as if it had been taken from one of those quaint and intriguing prints in the works of medieval philosophers. Small wonder, therefore, that after witnessing or indulging in such " steam tests," the idea gets around that turbines are hopelessly inefficient. Incidentally,

Continued from page 155, *August* 5, 1954.



General arrangement of single-stage impulse turbine and 5 : 1 ratio reduction gear

I sometimes wonder whether the most horrible examples can be any worse than *some* of the reciprocating engines I have seen ! But that is a purely negative argument, which gets us nowhere, and the point to consider is how to develop the inherent possibilities of the turbine in a really practical way.

I have always had a firm belief in the model steam turbine, and have made quite a few models which behaved reasonably well, though far below theoretical standards. In the course of marine engineering experience, I have handled many turbines, including main engines, mostly of the Parsons reaction type, up to 60,000 h.p., and auxiliary plant using high-speed impulse turbines, so that I have had opportunities of examining their internal details, and forming conclusions as to adapting their principles in a small size. Most readers will, I think agree that the most popular form of marine turbine—the Parsons reaction type—is very difficult if not impossible to model successfully, not only on account of the multiplicity of rotor and stator blading which is absolutely essential to its success, but also because of the fine blade clearances. It may be observed that these are measured in thousandths of an inch in the full-size turbines, and a special instrument is fitted to the turbine casing for checking them while running.

De Laval Turbines

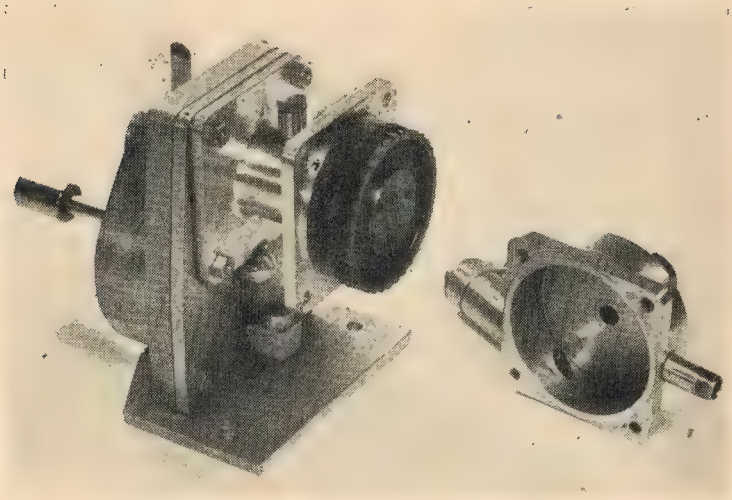
The impulse turbine is the only type which has been successfully employed in a small size, so far as I am aware, and the best known of these is the de Laval type, which depends for its success on the use of a high rotor speed and a special form of blade, in conjunction with a nozzle in which the pressure of the steam is converted into kinetic energy. A very high degree of accuracy in these components is essential to efficiency.

It is in the production of the rotor blades that the constructor of a turbine encounters the greatest difficulty. The methods employed in full-size practice, namely, the use of separately formed blades assembled and mechanically locked to the rim of the rotor disc, are hardly practicable, even apart from the difficulty of forming the individual blades. The old idea of fabricating the rotor, by soldering curved sheet metal blades—such as pen nibs—to the disc, has often been tried, and generally found wanting; the blade form, or rather the passage between the blades, is not correct, and it is very difficult to ensure the mechanical soundness and perfect balance which is so essential to success.

Most of the efficient model turbines which have been produced have had the rotors machined completely from solid metal, and Mr. Elkin and Mr. Chaddock have described two separate methods of forming correct de Laval type blades in this way. I have no criticism whatever of these ingenious methods, or of the results achieved by them in practice, but I have found, in duscussing turbines with many model engineers, that the difficulty of producing a rotor in this way assumes formidable proportions, and deters them from attempting turbine construction.

Modified Blade Forms

In the turbine which I am about to describe, I have used a form of rotor blade which is much easier to produce and which gives at least reasonably efficient results, though I have no means of comparing it with de Laval blading. No originality is claimed for this type of blade, as something very similar has been used in air turbines for pneumatic tools, and the gyroscopes of aircraft instruments. The original basis for the design may be regarded as an adaptation of the Riedler-Stumpf turbine, developed many years ago on the Continent and now applied, in a modified form, fairly extensively for auxiliary work in America. I believe that something similar has been used by Mr. J. A. Bamford in the turbine of his flash steamer *Hero*. Incidentally, I may mention that many other forms of blading are possible and could be used in a turbine following the



The turbine with casing removed to show rotor

design shown here in general construction; experimenters may well use the design as a "guinea pig" for turbine research.

In the general arrangement drawing of the turbine, the broken-away portion of the casing in the end view reveals a part of the rotor, in which it appears at first sight that the rim is provided with plain teeth, formed like those of a ratchet wheel Such a turbine, in conjunction with a steam jet arranged tangentially as indicated, would undoubtedly work, and turbines with equally primitive blading have often been produced—not always by amateurs, either. But it would not develop the full power which should be possible, neither would it be economical, because the kinetic energy of the steam or air could not be utilised to full advantage.

With a plain, straight blade, whether in the form of a tooth, a paddle, or a bucket, the impact of the working fluid would be expended instantly on hitting the blade, and considerable shock would be produced. In an efficient impulse turbine, not only is provision made for reducing the shock of impact, but also of "following through" so as to avoid instant dissipation of kinetic energy, and to keep up the impulse on the rapidly receding blade until the fluid emerges on the other side, where it should (under ideal conditions) be practically "dead," in other words, devoid of both pressure and velocity. I do not propose to delve deeply into the theory of turbine design here, as it has been expounded far more ably by other experimenters I have mentioned, and considerable detail on the subject can be found in many text-books on steam turbines; but my brief and incomplete explanation will, I hope, set the uninformed reader on the road to clear *thinking*, which is the basis of sound theory in engineering.

"Bouncing Off"

Incidentally, I once saw a semi-technical description of a reaction turbine which described the steam as "bouncing off the stator blades on to the rotor blades, and vice versa." The idea of "bouncing" in this way is, of course, the last thing the designer intends, and the whole object of blade design is to promote smooth, progressive flow through the turbine without rebound, shock, or eddies. In the case of the de Laval impulse turbine, the curved passage through the blades, in conjunction with the entry angle of the jet, are arranged to attain this condition, but optimum results can only be achieved when the peripheral speed of the blades is approximately half the velocity of the flow of steam from the jet; that is why such turbines *must* be run at very high speed to attain their power, and in the event of being loaded to such an extent that the speed falls off badly they not only lose power, but also the ability to recover their speed until the load is reduced. In comparison with positive-pressure reciprocating engines, therefore, the performance of a turbine may appear disappointing, but it is often a case of wrong application or unsuitable speed ratio in proportion to load.

The "Crescent" Blade

In the turbine shown here, the blades are cut in the periphery of the rotor by means of a small diameter cutter fed in tangentially to produce a crescent-shaped recess. The jet is not only directed at a tangent to the rim of the rotor but also located at an angle, as shown in the side view, so that the jet of steam strikes the curved recess near one edge, at a fairly acute angle to its curvature at this point, and keeps up its impulse as it passes through to the other side of the rotor, where it is allowed to escape to exhaust. The rotor is made to a fine clearance in the casing, so that on shroud ring is not necessary.

Transmission

A spur reduction gear of 5 to 1 ratio is used to transmit the power to the output shaft; for many purposes, a larger reduction ratio would be desirable, but I have kept the gearing as simple as possible, and this ratio is the highest which can be obtained conveniently and efficiently in a single stage of spur gearing. The rotor runs at a speed of 20,000 r.p.m. under load on quite a moderate steam pressure of 30 to 40 lb. per sq. in. at the nozzle, which is 0.015 in. diameter at the throat; this gives an output shaft speed of 4,000 r.p.m.

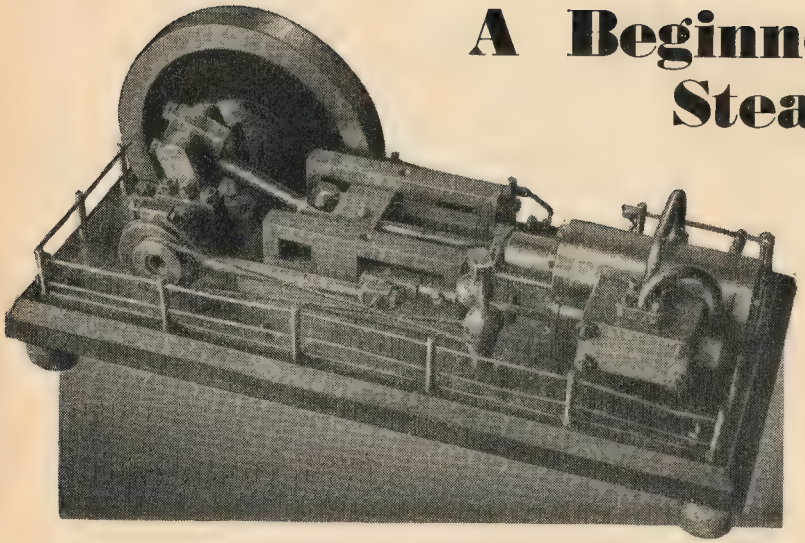
The experimental turbine was made from components machined from the solid or fabricated, and has been hacked about a good deal in the course of experiments, but I have made the drawings to suit construction from castings, and hope to be able to arrange for the supply of these in due course.

It may be mentioned that when originally constructed, the rotor shaft was mounted on $\frac{1}{8}$ in. ball races, housed in the end covers of turbine casing and gear housing respectively. A labyrinth gland, with no actual contact between rotating and stationary parts, was fitted between the rotor and the gear pinion. Oil throwers were fitted to the shaft adjacent to the bearings, and means provided for flushing oil through the races after a run. Despite these precautions, however, it was found impossible to keep condensate out of either the gear housing or the bearings and the latter would "freeze" solid in a day or two if not dismantled immediately after a run. A long plain bush has now been fitted, lubricated with thin oil and graphite, and has given no further trouble up to the present.

(*To be continued*)

A Beginner's Steam Engine

By J. Grimley



EDITORIAL NOTE:—*In case some of our readers may think that the design of this engine is somewhat below the high standard usually expected of models illustrated in* THE MODEL ENGINEER, *we would draw attention to the fact that it is the work of a beginner, only* 14 *years of age, who appears to have made a very promising start in model engineering. We are always sympathetic towards the work of beginners of all ages, and the youth of today has a special claim to encouragement.*

Whatever criticism may be made on the score of design, there is no question that the workmanship of the model is extremely sound.

THE steam engine illustrated in the two photographs represents the result of my first attempt at model engineering. It is erected on a baseplate of sheet brass measuring 4 in. × 10 in. × $\frac{1}{16}$ in. thick, which in turn is mounted on a piece of wood, with four rubber door stops on the underside.

The Cylinder

This is made from a piece of phosphor bronze, and is $\frac{3}{4}$-in. bore, the port block and base being sweated on, all contact faces being first tinned and clamped together, then reheated. The ports were then cut, the size being $\frac{1}{2}$ in. × $\frac{3}{16}$ in. for the exhaust, and $\frac{1}{2}$ in. × $\frac{1}{8}$ in. for the inlet. The overall travel of the slide valve is $\frac{1}{4}$ in.

Both cylinder covers have spigots which register in the cylinder bore. The rear cylinder cover is secured by four cheese-head screws, with four additional dummy screws fitted to improve the appearance. The front cover and packing gland are in one piece, graphite yarn being used for packing.

Two cast-iron rings are fitted to the piston, which is made from a brass disc, first turned down to 1/64 in. oversize, then secured to the silver-steel piston-rod, and the turning completed while truly mounted on the rod to ensure that piston and rod are quite concentric.

The Guide Bars

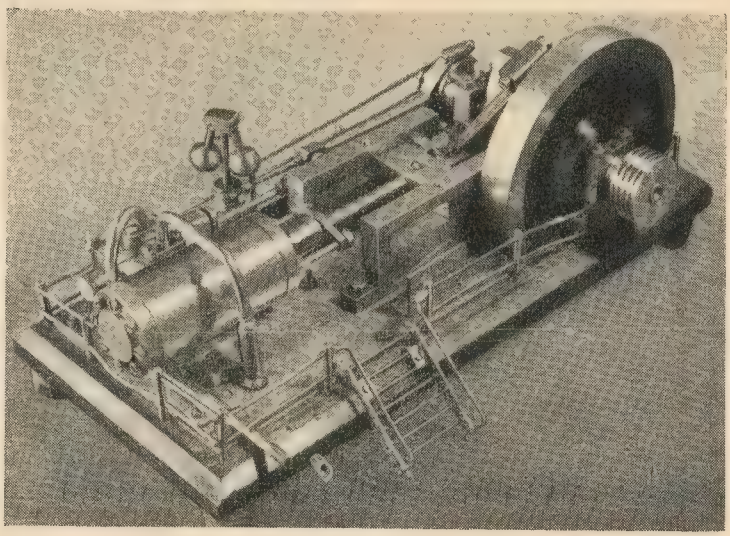
These were milled from steel bar $\frac{3}{8}$ in. × $1\frac{1}{2}$ in., holes being first drilled in them, and slotted out with an end-mill in the lathe. The cross-head was also cut and filed from $\frac{3}{8}$-in. × $1\frac{1}{2}$-in. bar, and then held in a three-jaw chuck for drilling and tapping the piston-rod. A cross hole for the wrist-pin was then drilled at right-angles to the piston-rod hole. The crank shaft was cut from solid steel bar, $5\frac{1}{2}$ in. × $1\frac{1}{2}$ in. × $\frac{1}{2}$ in., which was marked out for two centres at each end, all four being centre-drilled by holding the bar in the four-jaw chuck, then as much of the surplus material as possible was cut away. It was then remounted in the chuck, and the crank-pin turned. The shaft was turned between centres, and later a pair of balance webs were fitted.

Main bearing housings are also cut from steel, and were split before being bored to accommodate brass bushes. The big-end is split and fitted with split brasses, and a solid bush is fitted to the little-end. A tapered steel connecting-rod is fitted to the shank, being $\frac{1}{4}$ in. diameter at the little-end and $\frac{3}{8}$ in. at the big-end.

The Steam Chest

This was cut from a piece of cast-iron $2\frac{1}{2}$ in. × $\frac{3}{4}$ in. × $\frac{1}{2}$ in. After drilling and filing out the aperture, it was held in the four-jaw chuck, and a hole for the valve-rod drilled. The packing gland was then made and fitted, being held in place by two $\frac{1}{8}$-in. Whitworth screws. A piece of $\frac{1}{8}$-in. plate filed to shape and

(*Continued on page* 234)



IN THE WORKSHOP
BY DUPLEX

A Stand for the Electric Hand Drill

THE position of the fulcrum bracket *J* on the column of the machine is shown in Fig. 9.

This fitting is split so that it can be secured to the column by tightening the Allen clamp-screw; it is also moved upwards or downwards for adjusting the distance between the drilling head and the drill table. On its right-hand side, the bracket is drilled and then tapped $\frac{5}{16}$ in. × 40 t.p.i. to receive the shouldered bolt *L* on which the link *K* pivots.

The bracket is also drilled with a $\frac{1}{2}$ in. diameter hole for mounting the guide spindle *M*. When machining this hole, in order to align the parts correctly, the bracket together with one of the bracket plates *A* should be mounted on a length of $1\frac{1}{8}$ in. diameter shafting, so that the plate will then serve as a drilling guide. The swing link *K* is of built-up construction with a bearing boss pinned and brazed to either end of the arm. To ensure that the guide spindle *M* moves freely in its guide, it should be turned between centres and the lower abutment shoulder accurately faced.

After the feed gear has been assembled and a compression spring of suitable strength fitted to the guide spindle, the drilling head should move freely on the column when the feed handle is depressed. The range of feed movement obtainable amounts to approximately $1\frac{1}{2}$ in.

Continued from page 172, *August* 5, 1954.

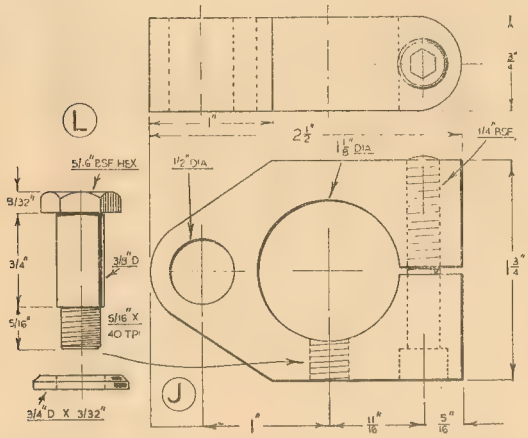


Fig. 12. *J—the fulcrum bracket; L—the swing link bolt*

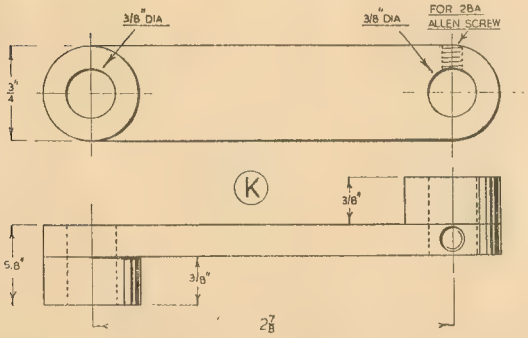


Fig. 13. *The swing link*

Fig. 14. *The fulcrum bracket and guide spindle*

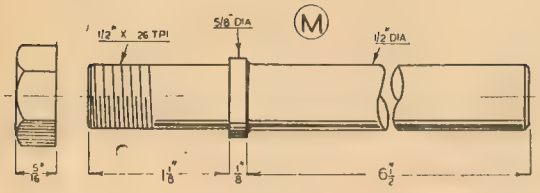


Fig. 15. *The guide spindle*

plunger and so keep the switch closed.

For releasing the trigger and opening the switch, a sliding thumb-catch *S* is secured to the plunger by means of two 8-B.A. screws. These screws pass through the plunger and also engage in a small rectangular block which forms an abutment face for the compression spring.

With this arrangement, the motor switch is closed by gripping the

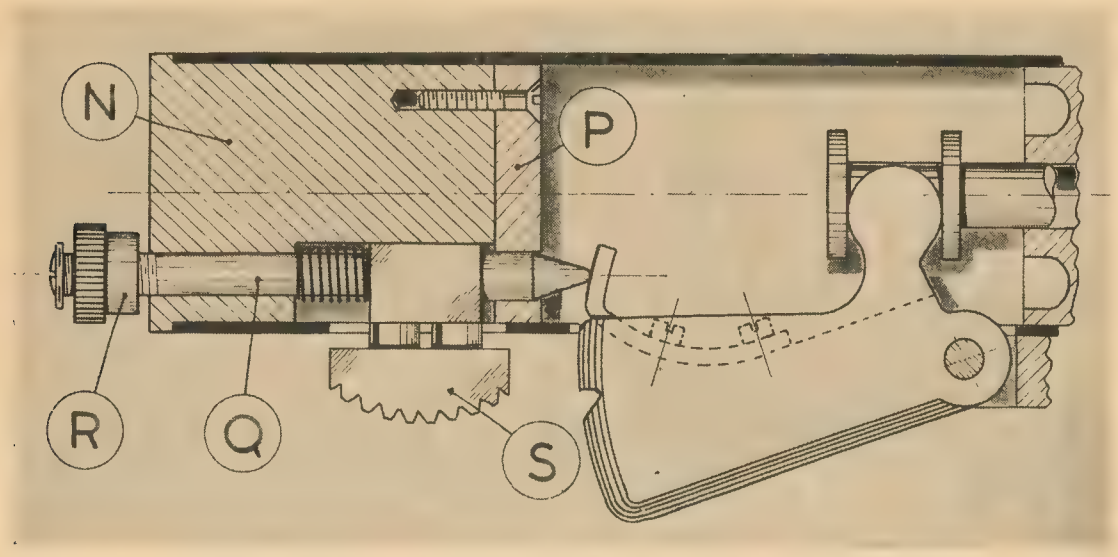


Fig. 16. *The switch locking mechanism. N—the plunger guide body; P—the guide plate; Q—the plunger; R—the withdrawal nut; S—the thumb slide*

Modifying the Switch

Although the drilling machine is now complete, working will be made more convenient, and the left-hand will be freed, if the switch is fitted with a spring-loaded catch to maintain it in the closed position during drilling.

This device consists of a body part *N*, fitting into the end of the tubular handle and carrying a spring-loaded plunger *Q*.

The body is fitted with an end-plate *P* which forms a bearing for the projecting end of the plunger and, at the same time, limits its forward travel. At its outer end, the plunger is furnished with a knurled finger-nut *R* so that, when this nut is screwed inwards, the plunger is withdrawn and the switch is no longer kept closed automatically.

It will be noticed that an extension-piece has been fitted to the trigger to form a guide face for the tip of the plunger and, in addition, a notch has been filed in the trigger itself to receive the point of the

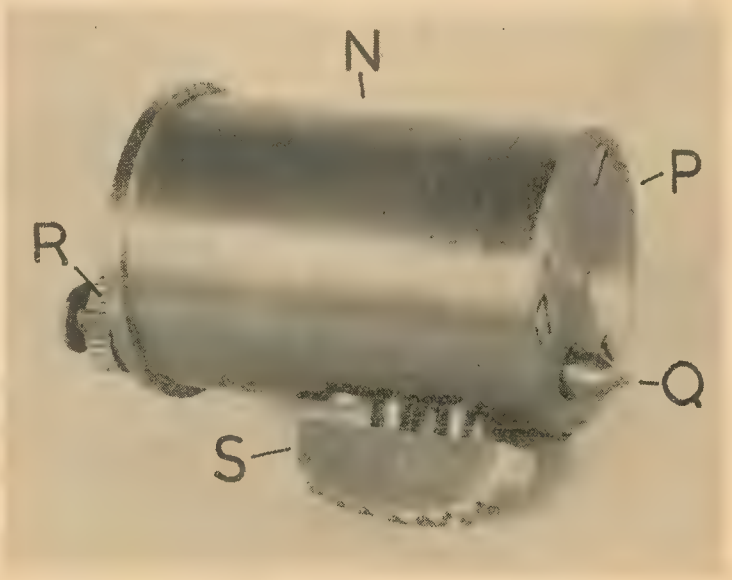


Fig. 17. *The switch locking device*

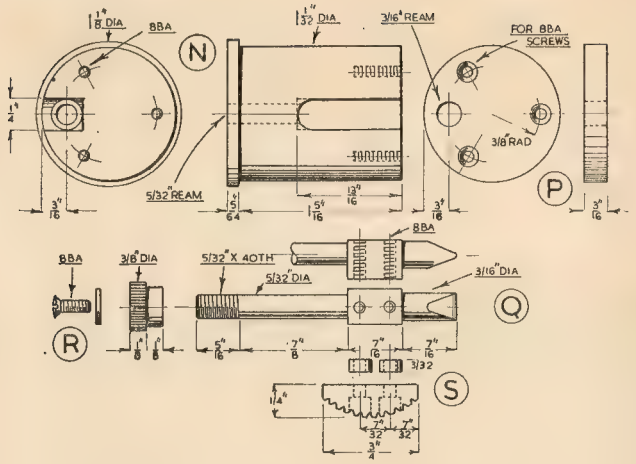


Fig. 18. *The components of the switch lock*

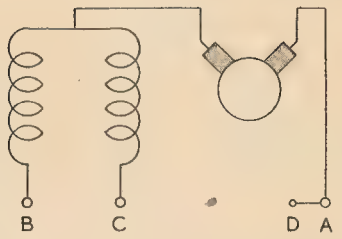


Fig. 19. *The standard arrangement with duplicate field windings*

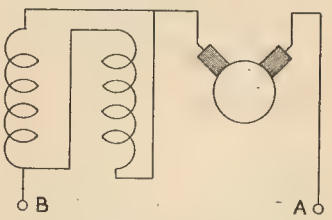


Fig. 20. *The two field windings connected in parallel*

trigger with the fingers, and then opened by a single movement of the thumb.

Alterations to the Motor

As mentioned in the previous article, the 1/3 h.p., low-voltage motor used in the present instance has two field windings, wound in opposite directions, so that the motor will run in either direction, according to which winding is switched in. It should, however, be noted that these motors have an intermittent rating; that is to say, they can be run under full load for a period of some three minutes, but after that overheating is liable to occur. Although this is of no great significance where the motor supplies the power for ordinary light drilling, it seemed that the output of the motor might be increased, and the heating effect reduced, if both field windings were used for unidirectional working.

The standard wiring connections are as represented in Fig. 19, and the letters correspond to those engraved opposite to the four connecting-pins on the terminal block of the motor.

The pins marked *A* and *D* are interconnected and are wired to one of the armature brushes. The points *B* and *C* are connected to the free ends of the two opposed field windings.

The terminals *A* and *B* or *A* and *C* are connected to the supply circuit, according to the direction of rotation required.

If the two field windings are connected in parallel and then joined to the second armature brush, as shown in Fig. 20, there will now be half the original field current passing in each of the two windings, but the total field strength will remain as before, and the value of the armature current will not be materially affected. However, the voltage drop across the fields is now halved and less heat will be generated in these windings. As a result, the motor will run cooler and can be worked for longer periods without becoming overheated, in addition, the speed and torque will be unaffected for the same input voltage.

When making this alteration to the motor connections, the four leads from the ends of the field coils are disconnected and then reconnected to terminals or plug connectors fixed to a new terminal block. It should, however, be borne in mind that sufficient power for most purposes will be obtained by lowering the supply voltage to 14 V, and the heating effect will, at the same time, be correspondingly reduced.

To alter the direction of rotation of the motor, it is only necessary to reverse the two leads to the armature brushes shown in Fig. 20.

A BEGINNER'S STEAM ENGINE

(*Continued from page* 231)

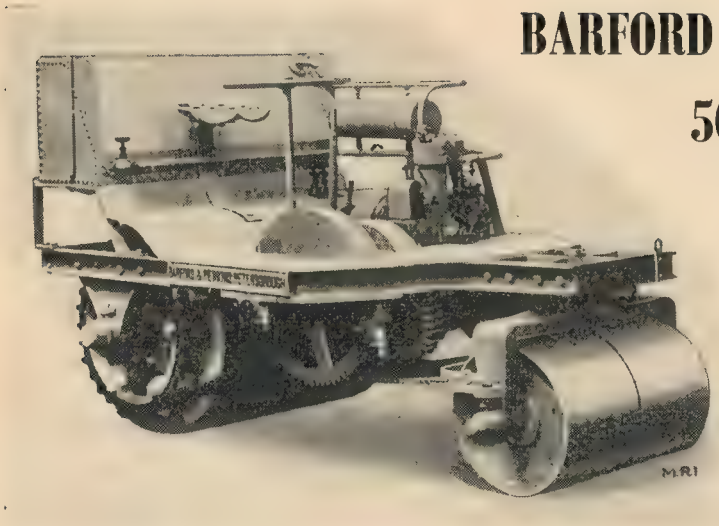
size forms the steam-chest cover. A D-slide-valve was made from brass bar, which was first cut to size, and the exhaust recess and the valve-rod slide filed on the back. It is held up to the port face by two springs, which press on a block held by a small grub-screw. The rod is made from $\frac{1}{8}$-in. silver-steel, and the crosshead for the valve is slotted to provide for adjustment; the pin can slide up or down the slot, and can be locked in position.

An eccentric strap was made from $\frac{1}{4}$-in. plate, the throw being $\frac{1}{8}$ in., and it is split and fitted with a split bush at the big-end. The shank is taper turned, and the little-end also bushed.

To make the eccentric sheave, a piece of $1\frac{1}{8}$ in. diameter steel was turned down to 1 in. diameter and a groove $\frac{1}{8}$ in. $\times$ $\frac{1}{4}$ in. wide cut to take an eccentric strap. This was then parted off, and set up $\frac{1}{8}$ in. off centre in the four-jaw chuck for drilling, boring and turning the boss, after which it was reversed and faced. The flywheels was made from a cast-iron gear wheel, with the teeth removed, and bushed to fit the crank shaft.

The recesses of the wheel were painted black. To finish off the model, a small ladder and handrail were made from $\frac{1}{16}$-in. wire, and a belt-driven dummy governor was fitted.

BARFORD MOTOR ROLLERS' 50th ANNIVERSARY



The first Motor Roller to be designed as such and not as a Steam Roller adaption. Weighing 2½ tons empty, 3 tons filled with water ballast, and powered by Simms 8 h.p. petrol engine, it inaugurated a roller production line that has grown, unbroken through fifty years

JUST fifty years ago, Barford & Perkins of Peterborough built the first two-wheel, or tandem, motor roller, a machine that was also the first internal combustion powered unit to be designed as such and not as a steam roller adaptation. Production has been continuous ever since, despite the interference of two wars and two factory removals.

Notwithstanding considerable prejudice against, and active hostility to all mechanically propelled vehicles, interest was aroused right from the " Pioneer's " first public appearance, at the 1905 Royal Show, where it was sold for £155 to a land speculator acting on behalf of the Leatherhead Golf Club. Thanks to an energetic sales policy of exhibition and demonstration, directed personally by the company's chairman, J. G. Barford, sister machines were quickly placed with Canon Hill Park, Birmingham, Lord's cricket ground, and sundry estate owners throughout the country.

By exhibiting and demonstrating abroad as forcefully as at home, Barford & Perkins established the motor roller idea so successfully that within the few years to the outbreak of war, a whole range of machines from 2½ to 14 tons, was developed and sold into more than seventy countries, including the United States. All save one light model, were of the tandem type, powered by petrol or paraffin engines, and serious inroads were made into the road rolling market, which hitherto had been the preserve of the steam roller.

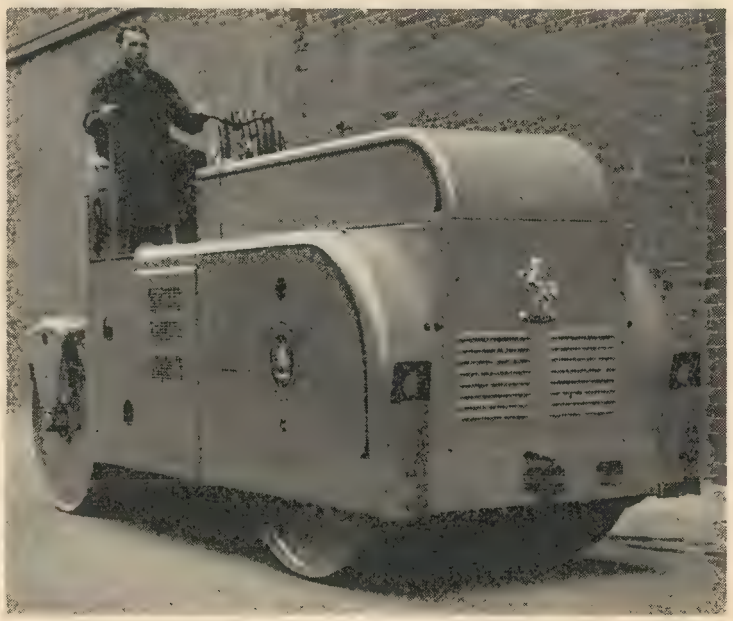
After building considerable numbers of motor rollers for the fighting fronts, Barford & Perkins set out during the post-war period, to maintain their lead in design. Giving serious attention to three-wheel rollers for the first time, a design was produced that set a pattern still followed by many manufacturers today, the essentials comprising short wheelbase, low centre of gravity and engine at the extreme rear.

These were followed in a few months by a new series of tandem rollers embodying, for the first time ever, a quick-reverse mechanism that assisted appreciably in reducing indentations in newly laid surfaces, caused by rollers sinking in whilst stationary during the reversing procedure.

A third major development introduced by Barford & Perkins during the twenties, was the substitution of diesel engines for petrol and paraffin.

Diesel was barely established before the company moved to Rochester, Kent, to join forces with steam roller pioneers Aveling & Porter. Formal amalgamation followed in 1933, the combined firm, Aveling-Barford Ltd., at once moving to the present headquarters at Grantham, Lincs. Both the Aveling and the Barford ranges remained in

(*Continued on next page*)



The latest Tandem Roller, powered by 42 b.h.p. diesel engine, introduced into the Aveling Barford range in 1954

QUERIES AND REPLIES

"THE M.E." FREE ADVICE SERVICE. Queries from readers on matters connected with model engineering are replied to by post as promptly as possible. If considered of general interest the query and reply may also be published on this page. The following rules must, however, be complied with:

(1) Queries must be of a practical nature on subjects within the scope of this journal.
(2) Only queries which admit of a reasonably brief reply can be dealt with.
(3) Queries should not be sent under the same cover as any other communication.
(4) Queries involving the buying, selling, or valuation of models or equipment, or hypothetical queries such as examination questions, cannot be answered.
(5) A stamped addressed envelope must accompany each query.
(6) Envelopes must be marked "Query" and be addressed to THE MODEL ENGINEER, 19-20, Noel Street, London, W.1.

Power of Small Motor

I have a small electric motor of German origin. The maker's label on this states that it is rated at 220 volts, 1.6 amps, 90 watts, 1,400 r.p.m. and 50 cycles.– Could you please tell me its approximate power. It is of the split-phase type and about the size of a normal ¼ h.p. motor. Would this motor be sufficiently powerful for driving a 3-in. lathe through a suitable speed reducing gear?

J.W.R. (London, N.10).

The information on the maker's label of your motor is a little contradictory, as it is rated at 220 volts 1.6 amps, 90 watts, but the product of volts and amperes represents 352 watts.

With 90 watts input and reasonable electrical efficiency, you might expect about 1/10 h.p. from the motor, but on the volt and ampere figures, it should be capable of well over ¼ h.p. In the latter case, it would be amply powerful for driving a 3-in. lathe by the usual arrangement of countershaft and stepped pulleys, and we recommend that the size of pulley for the countershaft primary drive should be from three to four times the diameter of that on the motor.

Regulating Blowlamp Flame

I have a 5-pint blowlamp obtained on the ex-W.D. surplus market, and find it difficult to use for brazing small work because there is no means of controlling the size of flame. I am informed that there is an attachment resembling the shutters of a camera, which can be fitted to the front of the burner and opened or closed to produce the size of flame required. Please inform me if this is correct, and where it can be obtained, or if not obtainable commercially, please give me a rough sketch to show its construction.

W.E.T. (New Haw).

We do not know of any attachment to a blowlamp which could be used to regulate the size of the flame in the way you suggest. It is extremely unlikely that any system of shutters on the burner tube could be used, as they would almost certainly interfere with proper combustion of the flame if the outlet is restricted, and would probably burn away with the intense heat.

Some types of blowlamps have a regulating valve for controlling the flame intensity, but not specifically the *size* of the flame. We would point out that a blowlamp of this type will not produce a fine localised flame like an air-gas blowpipe or oxyacetylene burner, but can be used only for more general heating.

Steam Engine Bearings

I have a horizontal steam engine 1⅝ in. bore × 2¼ in. stroke, 9 lb. flywheel and working off 75 lb. per sq. in. I fitted a new plain phosphor-bronz big-end bearing only a short time ago, and already there is obvious play and a knock. I am considering fitting a ball-bearing big-end of the type advertised by J. Burke in THE MODEL ENGINEER. *Would this be as satisfactory as adjustable split "brasses" phosphor-bronze? The crank pin is 7/16 in. long by ½ in. dia.*

Would a hardened pin running in a phosphor-bronz bush be longer wearing than a hardened pin running in a case-hardened eye, in the little-end of the connecting-rod? The little-end pin is 5/16 in. dia.

A.W.R. (Bletchley).

The use of any kind of ball—or roller—bearings in steam engines is a somewhat questionable procedure owing to the extreme difficulty of keeping condensed water from these bearings.

They have been used in certain types of steam engines with the precaution of sealing the bearings against entry of water and also to keep them lubricated, but generally speaking, adjustable split brasses are considered more satisfactory for all types of steam engines.

The crank pin would appear to be rather small for an engine of the size specified if it is worked under any appreciable load, and it is possible that the rapid wear of the bearing is due to insufficient bearing area. We should prefer to see a crank pin of ⅝ in. diameter × ¾ in. bearing length in this engine.

A hardened pin running in a phospher-bronze bush would give very good bearing life and would be better than using a case-hardened eye for the big-end, but the little-end, in which only a small angular movement takes place, is more satisfactory with a case-hardened eye, and in this case, the size of the pin is not so important, but a little larger than 5/16 in. would be desirable.

BARFORD MOTOR ROLLERS' 50th ANNIVERSARY

(*Continued from previous page*)

production until the end of the second world war, the main technical developments during this period being the introduction of fluidrive hydraulic couplings into the Barford rollers, and the general adoption of the underslung forecarriage in place of the transverse front fork previously standard.

After supplying considerable numbers of rollers to the Forces during the war, all pre-war designs save one Aveling steam roller, were discarded and replaced by the still current "G" Series three wheel machines, which brought the engine back to a position forward of the rear rolls, and introduced the pressure balancing device, which enabled the one type of machine to undertake both compaction and surface finishing, thus outmoding the tandem.

The "G" Series rapidly became popular, exports alone outstripping total United States production, and they have played a small, but valuable part in the dollar-earning and dollar-saving campaigns. They were not destined finally to eclipse the tandem, however, since machine-laid hot bituminous surfaces were developed and these called for a light rolling for which a three-wheel machine is not really suited, however evenly its front and rear pressures are balanced. 1954, therefore, the fiftieth year of continuous Barford motor roller production, has seen the reintroduction of tandems into the range, with a model built in two sizes, designed especially for modern needs and backed by an experience greater and longer than that of any other manufacturer.

READERS' LETTERS

Letters of general interest on all subjects relating to model engineering are welcomed. A nom-de-plume may be used, but the name and address of the sender must accompany the letter. The Managing Editor does not accept responsibility for the views expressed by correspondents.

THE SCOPE OF THE "M.E."

DEAR SIR,—My wife recently had an operation on her foot and finds it painful to have to stand at outdoor functions. I have just finished making her a shooting-stick to Mr. Bedford's design (published in the March 19th, 1952 issue) but reduced to $\frac{7}{8}$th-scale for feminine use, and it is the greatest success. Many thanks to Mr. Bedford for his excellent contribution, and to you, Sir, for publishing it.

Although I much enjoy THE MODEL ENGINEER regular features on steam, i.c., and workshop practice, I much hope that you will continue to include your occasional articles on refrigerators, shooting-sticks, kitchen-mixers and the like. Although not strictly model engineering, I am sure they are appreciated by many besides myself.

How about a simple motor scooter?

Yours faithfully,

London, S.W. ROBERT GAYNER.

THE LOCOMOTIVE OF THE FUTURE

DEAR SIR,—I am always fascinated by suggestions and designs for the super locomotive of the future, as this is one of my own pet amusements; but as I have my own very definite ideas, it is rather natural that I seldom agree with what others suggest! Also, my own designs have always been based on what could be placed on British metals at the present time, whereas most others presuppose at least, an increase of permissible axle loads up to say, 30 tons, and in some cases larger dimensions as well.

My own views are that we could get all the power we want without increasing weights or sizes; whether it could be got with the simplicity demanded nowadays is another matter. Anyway, note what Swindon is achieving with the "Kings" and "Castles" with the most trifling of modifications. Mr. W. B. Hocking's *City of Truro* is one of the larger versions, it is also by no means simple, and as it is put forward as a serious contribution, I do hope he will not take it amiss if I criticise one or two points.

First, the 90 sq. ft. grate; this is very large, and knowing that the French designers have just about reached the limit of size for 2 L.P. cylinders to go with 55 sq. ft. grates, my first reaction is that as a compound the cylinders would not be able to make proper use of the boiler. Fortunately we have two designs with which to compare that of Mr. Hockings, one the S.N.C.F. —232-U1, probably the last word in compound design, a locomotive in being which we know performs superbly, the other, one of M. Chapelon's projected designs, for he also indulged in this amusement, there being a whole series of designs for the future in his book *La Locomotive a Vapeur*; this one is a 4-6-4 for North American conditions with a grate of 75 sq. ft. and 87 tons adhesion. The 232-U1 has a grate of 56 sq. ft. and 61 tons adhesion; compared with both these designs Mr. Hockings' locomotive should have L.P. cylinders 30 per cent. larger and would necessitate four L.P. cylinders as is provided for in the Chapelon design.

If Mr. Hockings wants to retain this huge boiler, far better to make the machine a straight four cylinder simple with four 22 in. × 28 in. cylinders; it is just a needless complication and expense to provide for compounding if this cannot be used for the main part of the work. Alternatively, keep the engine as a compound with 30 in. × 28 in. L.P. cylinders and reduce the grate to 70 sq. ft., this smaller boiler would reduce the excessive axle loading and still leave plenty to deal with the power. If this were done the H.P. cylinders would have to be dealt with as they are much too large, their ratio to the L.P. is only just over 1 to $1\frac{1}{2}$. They should be reduced to 20 in. or 21 in. × 28 in., and all thought of using the machine as a four cylinder simple should be given up, except of course for starting or for some very exceptional condition. These simple-compounds have been in use in France for the last 60 years, and have been practically universal there; except on the late P.L.M. line, the results obtained from them have been an example to the rest of the world. They are not used as simples in ordinary running, because using them as compounds gives better results and all the power that can be used. Actually if the H.P. engine be designed to work most effectively and efficiently when exhausting into the pressure of the receiver it will not be efficient if exhausted into the atmosphere; possibly this could be overcome, but it would mean considerable complication, and it would just not be worth it. Long experience has shown that there is no call for long periods of simple working. I fancy it was thought originally that this simple working would be needed, but it was soon found that it was not and when superheating came in no one ever thought it necessary to provide superheated steam to the L.P. cylinders, the saturated supply being quite suitable for the brief periods when it is used. Those who consider that simpling would be necessary have not seen these machines at work.

The mechanical arrangement of the cylinders is novel and takes a lot for granted. Presumably offset L.P. connecting-rods are intended and certainly while this feature has been used before, on the 4-8-2 locomotives of the Est line of France, with 26 in. L.P. cylinders at $27\frac{1}{2}$ in. centres, but there the offset was only about $1\frac{1}{2}$ in. while Mr. Hockings' machine would want a lot more as his L.P. cylinders are at about $32\frac{3}{4}$ in. centres; such a large amount of offset would require a very special design of crosshead and slide bar or alternatively an extra strong piston-rod and glands capable of taking side thrust. It would seem that offset would have to be applied to the H.P. as well as they are shown at about 6 ft. 1 in. centres, but as I have said earlier these outside cylinders should be reduced anyway. I still think the locomotive is too large for our needs, but anyway let's get it right.

Yours faithfully,

Bexhill-on-Sea. C. M. KEILLER.

THE APPLEFORD TRACTION ENGINE RALLY

DEAR SIR,—May I express the enjoyment derived from your article on, and pictures of the above. I was there, and enjoyed every minute of the day. In spite of the appalling weather conditions overhead, and mud underfoot, how friendly and good-tempered everyone was.

You mention a 1900 Burrell entered by S. A. Smith of Cressing; I noticed this engine was the only entrant with a full set of spuds, and in consequence it was in evidence helping along less fortunate entrants. I saw it, No. 18, towing a Fowler

Showman's engine during the Grand Parade; a battery of cameras appeared to be trained on it. I have been wondering if one of your readers would be kind enough to lend me a negative of this or any other incident. I would take great care of such a negative and return it promptly.

Yours faithfully,
Sudbury, Suffolk. G. W. DIXON.

STEAM LAUNCHES ON THE THAMES

DEAR SIR,—I am a very interested reader of THE MODEL ENGINEER and I read in the issue of May 13th a note about steam launches in 1954. It states there have not been any steam launches built on the Thames for more than 30 years. Messrs. Salters Bros of Oxford, whom I am working for, have built two, the *Cliveden* in 1932 and the *Maple-durham* in 1927. These are both fitted with Sissons engines and are triple expansion. Working pressure of *Cliveden* is 210 and *Mapledurham* 200 lb. p.s.i.

I was engineer on the *Maple-durham* for nine years and have been with the firm 21 years; also, I am in my 72nd year of age, and am the oldest engineer in years and service on the firm. I work in the boiler shop during the winter months. I am at present driving a set of Sissons engines, triple expansion, dated 1896; they are still in thoroughly good condition and quite capable of doing a lot more work, which shows that Sissons engines are very reliable and practically indistructible. I also drove a set of compound engines from 1914 until 1927, made by the same firm and they were machined and polisned all over, even the bed, or soleplate, was polished. These were made in 1902 and were a fine set.

Yours faithfully,
Oxford. WM. ARNOLD.

PUNCHING SHEET METAL

DEAR SIR,—I feel I must raise the strongest possible protest at your method of producing holes in thin sheet metal—(" Queries & Replies," 8/7/54).

Surely the method shown would cause damage to the feed of the machine, and incidentally, with a pillar machine, I should not fancy guaranteeing a hole drilled squarely after such an operation

Also, it has been my experience, at least, with good quality drills, for them to have shanks a few thou. smaller than the cutting edge of the drill, and also left softer, in case of chuck slip.

In my opinion, a better method, would be a hardened flat-bottomed punch, with really sharp and square edges, made either from silver-steel, or a ground-down tool shank, such as a centre drill of tne requisite size. Then a die made of two pieces of, say, $\frac{1}{8}$ in. mild-steel plate case-hardened. If equally spaced holes are required, a locating pin can be inserted. The material is then placed between the two plates, the punch inserted in the hole in the top plate, and given a sharp clout with a hammer. The material is then fed along until the hole just made fits over the locating pin, and proceed *ad lib*. Alternatively, with unequally spaced holes, the job may be marked out, and drilled with the tip of a No. 1 centre drill (this applies only on holes up to about $\frac{3}{8}$ in. diameter). A punch is then made up with a pilot pin to suit this hole; the die can be used in the same way, only removing the locating pin first.

Yours faithfully,
Wimbledon. D. W. COOK.

CUTTING KEYWAYS

DEAR SIR,—With reference to an arcticle in THE MODEL ENGINEER, dated July 1st, 1954, page 23, " Shaping a Long Keyway in the Lathe," (W. J. Hughes); might I suggest to readers that this same result may be achieved very simply by locking the work-piece to the lathe bed or tailstock.

On running the lathe, the work will remain stationary, but the head-stock spindle will rotate, and feeds may be used. The rate of feed being controlled by the spindle speed.

A running centre in the mandrel nose is, of course, advisable but, where this is not available, the lathe saddle can be operated from left to right, thus relieving the pressure on the rotating centre.

This method can also he used when a milling attachment is available for the cutting of keyseats, but cannot, of course, be used for the cutting of splines.

Yours faithfully,
Tavistock. E. V. WHITE.

THE MODEL ENGINEER DIARY

August 19th, 20th, 21st. Ramsgate & District Model Club.—Exhibition at Club Headquarters, Princes Street, off Queen Street, Ramsgate. Open from 3.0 p.m. to 9.0 p.m. daily, except on Saturday, when the opening time will be 10.30 a.m.

August 19th, 20th, 21st.—Weymouth & District Model Engineering Society.—Model Railways and Engineering Exhibition, at the Melcombe Regis Boys School, Weymouth. Open from 11 a.m. to 9 p.m.

August 19th, 20th, 21st, 23rd, 24th, 25th, 26th, 27th and 28th.—The Model Engineer Exhibition, in the New Horticultural Hall, Greycoat Street, Westminster, S.W.1. Open from 11 a.m. to 9 p.m.

August 21st.—Stephenson Memorial Miniature Locomotive Association.—Locomotive Rally on the Sunderland Model Engineers' track, in Roker Park.

August 21st, 23rd, 24th, 25th, 26th, 27th, 28th.—Brighton & Hove Society of Model Engineers.—Model Engineering and Handicrafts Exhibition, at the Corn Exchange, Church Street, Brighton, Sussex Open from 10 a.m. to 9 p.m. daily.

August 22nd. — Sussex Miniature Locomotive Society.—Locomotive trials on the society's 3½-in. and 5-in. gauge track in Beech Hurst Recreation Ground, Haywards Heath, Sussex. Running from 11 a.m. to 8 p.m.

August 25th, 26th, 27th & 28th.—Isle of Wight Model Engineering Society.—Exhibition at the County Secondary Grammar School, Nodehill, Newport, I.W. Open 2-30 p.m. daily, (Saturday 10-30 a.m.) until 9 p.m.

August 29th.—Model Power Boat Association.—Regatta at Victoria Park, Hackney, E.9.

August 31st, September 1st, 2nd, 3rd and 4th.—Brighouse Society of Model and Experimental Engineers.—Exhibition at the Drill Hall, Prescott Street, Halifax. 2 p.m. to 10 p.m. Tuesday to Friday; 10 a.m. to 10 p.m. on the Saturday.

September 5th.—Sussex Miniature Locomotive Society.—Visit of the South London Model Engineering Society to the society's 3½-in. and 5-in. gauge track in Beech Hurst Recreation Ground, Haywards Heath, Sussex.

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This periodical is sold subject to the following conditions, namely, that it shall not, without the written permission of the publishers first given, be lent, resold, hired-our or otherwise disposed of by way of trade except at the full retail price of 9d., and that it shall not be lent, resold, hired-out or otherwise disposed of in a mutiliated condition or in any unauthorised cover by way of trade; or affixed to or as part of any publication or advertising, literary or pictorial matter whatsoever.

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Pultra 10 mm. Production Lathes		
17/7 P 3DV 70 mm.	111 18 3	75 0 0
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Fitter Mechanic Required with life experience in use of hand and machine tools, accustomed to working to close limits, for work on small experimental mechanisms. No age limit. Permanent position. Conscientious all-round skilled men only need apply. Details of experience in date order in first instance to—DIRECTOR, Box No. 7402, MODEL ENGINEER Offices.

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Drill gauges 1-60, 13/-; 1/16"-½", 18/-. Independent chucks 4" 48/-; Burnerd 4½" £3-6-11. Dies 13/16" dia., 40 T.P.I., 5/32", 3/16", 7/32", ¼", each 2/9. B.A. 0-1-2-3-4-5-6, 2/2; 7-8 2/9; 9-10 3/6. Angle plate 3" 4/9. Drill stand 1-60 3/9. Silver steel round 13" lengths, 12 different sizes, 1/32" to 9/16" 10/-. H.S. centre drills, size 1, 2/-; 2, 2/3; ; 3, 2/9; 4, 3/-. Spring calipers, inside, 6" 5/-. Dividers 5" 5/-. Circular wood saws 6", ⅝" hole 10/-. Dieholder 13/16" 2/9. H.S. slitting saws, 1" hole, 3" x 1/16", 12/6; 3" x 3/32", 13/6. Abrafiles 8d. Links, 2, 4d. Hacksaws, 10" 3d; 12" 3½d. Fretsaws 12 off 9d. Stilson wrench 8" size 7/6; 10" 10/9. Tailstock dieholder 13/16", No. 1 M.T., 13/6. Precision drill chucks ½" 35/-. Cutting oil tin 2/6. H.S. Twist drills 1-2 2/6 each; 3-6 2/5; 7-11 2/1; 12-1 1/11; 17-19 1/10; 20-24 1/9; 25-29 1/8; 30-32 1/8; 33-42 1/4; 43-48 1/3; 49-52 1/2; 53-70 1/-; 71-75 1/6; 76-80 1/11; 1/16" 1/2; ⅛" 1/5; 5/32" 1/10; 3/16" 2/-; 7/32" 2/6; ¼" 3/1; 9/32" 3/10; 5/16 4/6; Adjustable spanners 9" 6/3; 11½" 7/8. Carpenters' squares 6" 3/9; 9" 6/6. H.S. tool bits, square 3/16" 1/2; ¼" 1/9; 5/16 2/7; ⅜" 5/6; ½" 8/6. Lathe centres No. 1 MT 4/3; No. 2 5/-. Pin vice 9/6. Taps 40 T.P.I. 5/32", 3/16" 7/32", ¼", 1/9 each, 32 T.P.I. 5/16" 2/4; ⅜" 2/7; B.A. 0-1-2-3-4-5-6 1(1; 7-8 1/3; 9-10 1/9. 26 T.P.I. 5/16" 1/7. Whit. 1/16" 1/8; 3/32" 1/8; ⅛" 1/2; ¼" 11d.; 5/16" 1/3. B.S.F. ¼" 11d.; 5/16" 1/3. Pint paraffin blowlamp 46/-. H.S. hand reamers ⅛" 9/-; 5/32" 8/9; 3/16" 8/3; 7/32" 9/8; ¼" 17/6. Faceplate dogs 2½", set 4, 4/9. H.S. end mills ¼" 9/6; 5/32" 9/6; 3/16" 9/6; ¼" 8/6; 5/16" 10/6. Burnerd self-centring chucks 4" £6-13-11. All tools. Leading makes. Your address block letters please.

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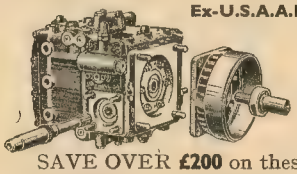

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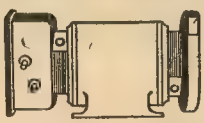

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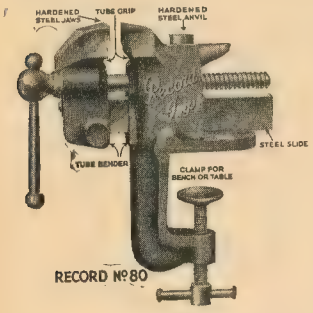

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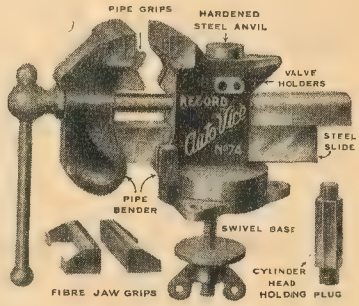

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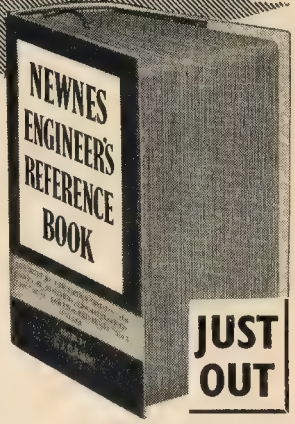

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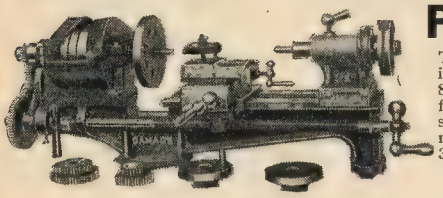

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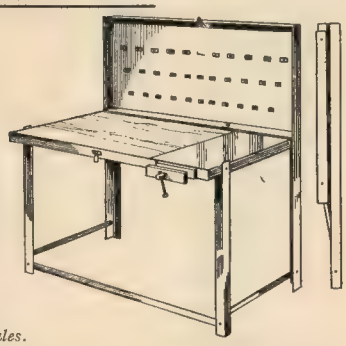

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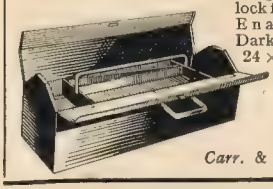

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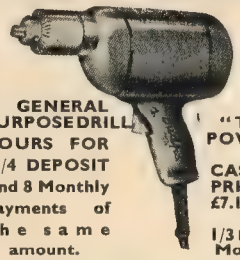

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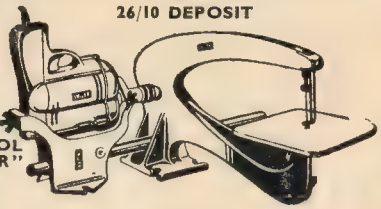

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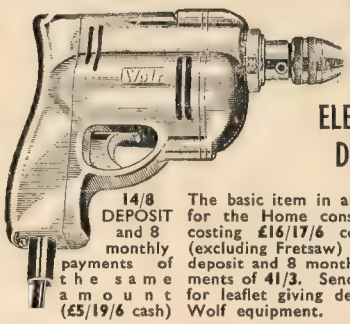

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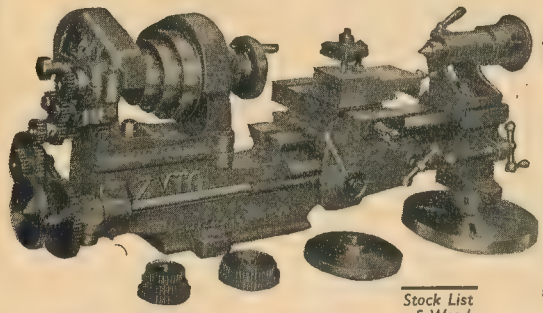

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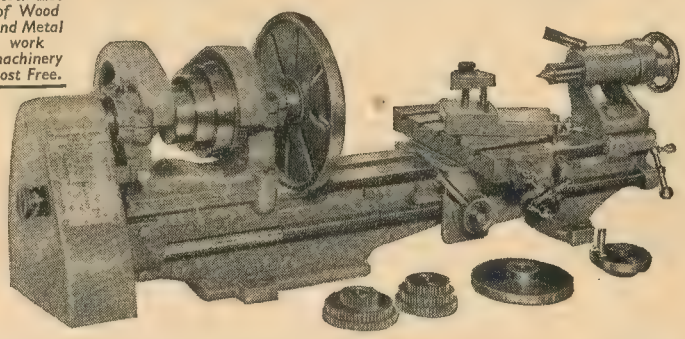

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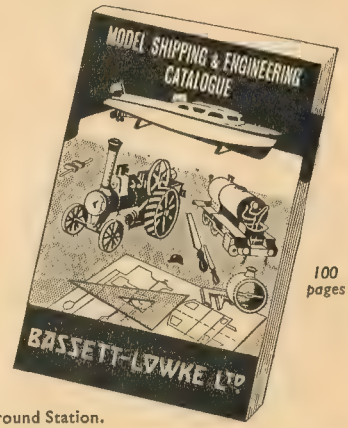

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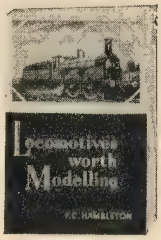

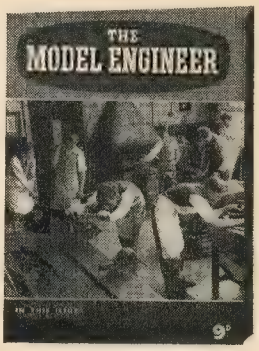

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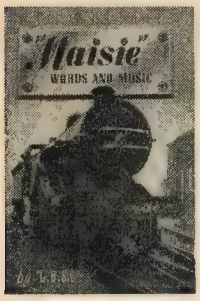

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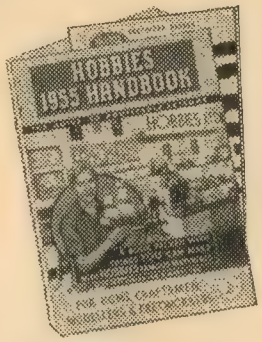

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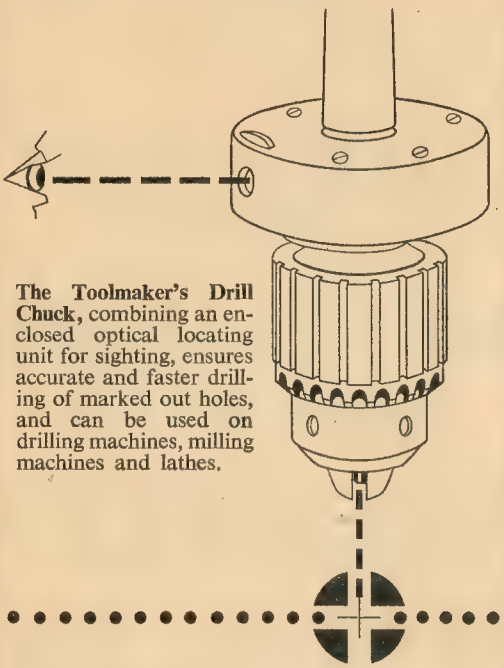

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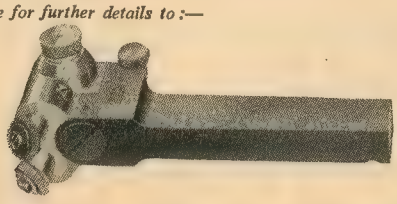

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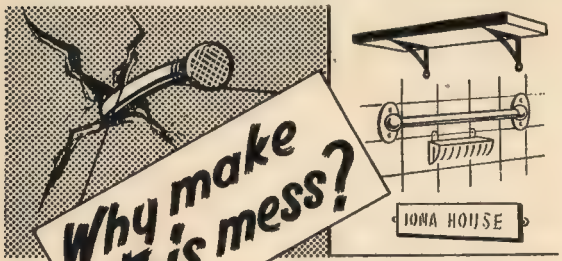

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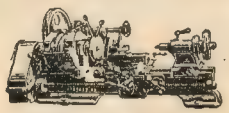

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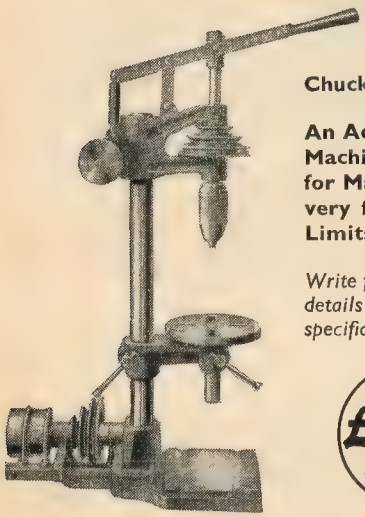

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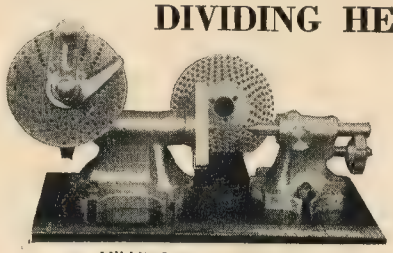

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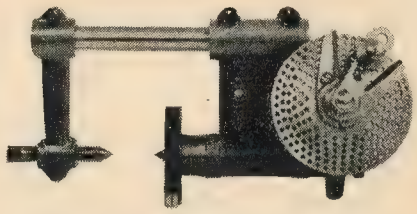

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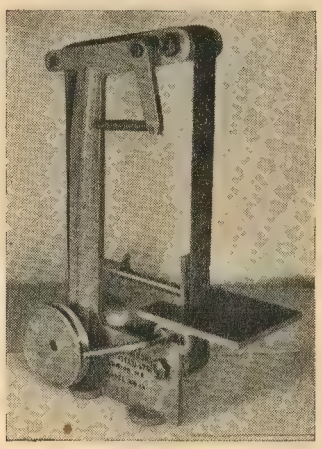

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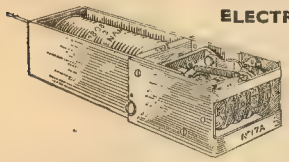

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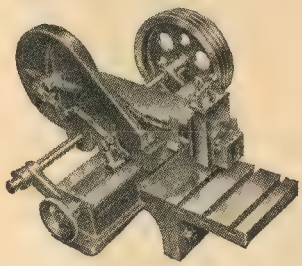

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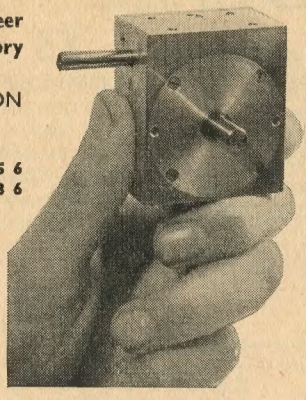

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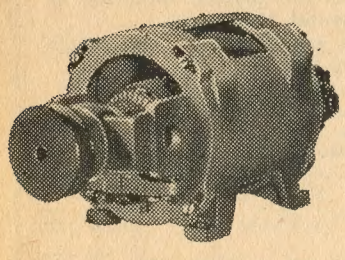

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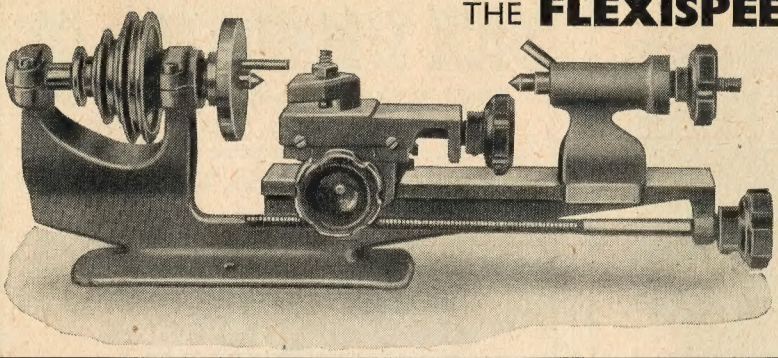

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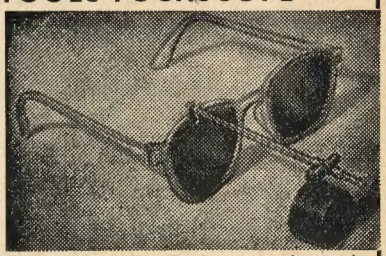

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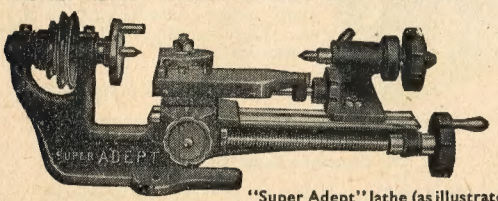

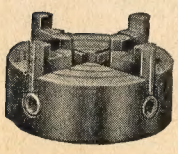

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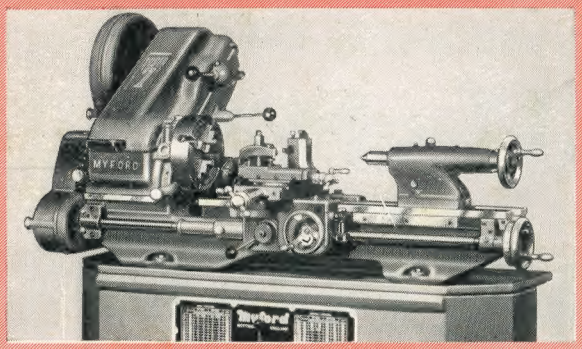

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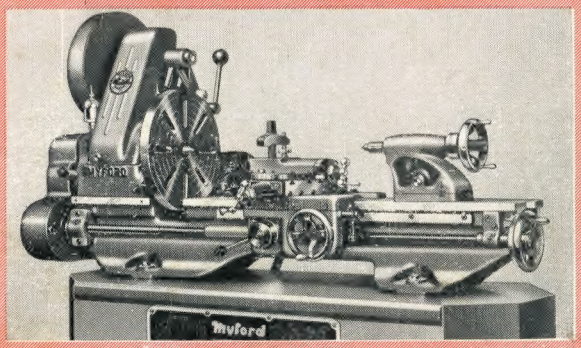

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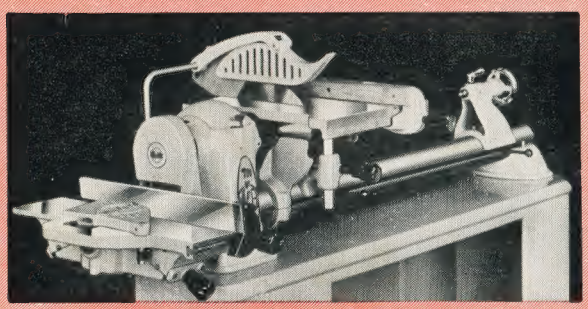

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